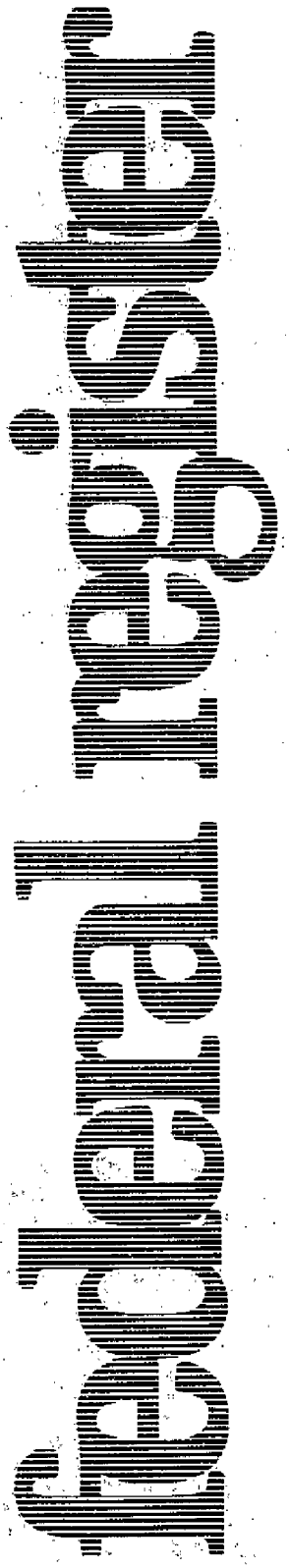

Tuesday
May 5, 1987

Part II

Department of Transportation

Research and Special Programs Administration

49 CFR Parts 171 through 179
Performance-Oriented Packaging Standards; Miscellaneous Proposals

DEPARTMENT OF TRANSPORTATION

Research and Special Programs Administration

49 CFR Parts 171 through 179

[Docket No. HM-181, Notice No. 87-4]

Performance-Oriented Packaging Standards; Miscellaneous Proposals

AGENCY: Research and Special Programs Administration (RSPA), DOT.

ACTION: Notice of proposed rulemaking.

SUMMARY: This notice proposes to amend the Hazardous Materials Regulations (HMR) to incorporate features found in the United Nations Committee of Experts' Recommendations on the Transport of Dangerous Goods (U.N. Recommendations) and the Technical Instructions for the Safe Transport of Dangerous Goods by Air of the International Civil Aviation Organization (ICAO Technical Instructions). This action is necessary to: (1) Simplify the HMR, (2) reduce the volume of the regulations, (3) promote flexibility and technological advances in packaging, (4) promote safety through better packaging, (5) reduce the need for exemptions, and (6) facilitate international commerce. The intended effect of this action is to align the HMR with the U. N. Recommendations and ICAO Technical Instructions in the areas of classification, packaging and hazard communication in the transport of hazardous materials.

DATES: Comments: Comments must be received on or before November 2, 1987.

Public hearing: A public hearing will be held on September 15 and 16, 1987 from 9:30 a.m. to 5:00 p.m. daily. If there is sufficient demand, the hearing will be extended through September 17, 1987.

ADDRESSES: *Comments:* Address comments to Dockets Branch, Research and Special Programs Administration, U.S. Department of Transportation, Washington, DC 20590. Comments should identify the docket and be submitted, if possible, in five copies. Persons wishing to receive confirmation of receipt of their comments should include a self-addressed stamped postcard. The Dockets Branch is located in Room 8426 of the Nassif Building, 400 Seventh Street SW., Washington, DC 20590. Telephone: (202) 366–5046. Public dockets may be reviewed between the hours of 8:30 a.m. to 5:00 p.m., Monday through Friday.

Public hearing: The public hearing will be held at the FAA Auditorium, Third floor, 800 Independence Avenue SW., Washington, DC.

Any person wishing to present an oral statement at a hearing should notify the Dockets Branch, by telephone or in writing, at least two days in advance of the hearing date. Each request must identify the speaker; organization represented, if any; daytime telephone number; and the anticipated length of presentation, not to exceed 10 minutes. The written text (if any) of an oral statement should be presented to the hearing officer prior to its presentation.

FOR FURTHER INFORMATION CONTACT: Thomas J. Charlton or Edward T. Mazzullo, Standards Division, Office of Hazardous Materials Transportation, U.S. Department of Transportation, 400 Seventh Street SW., Washington, DC 20590. Telephone: (202) 366–4488.

SUPPLEMENTARY INFORMATION:

Special Notices

The proposals presented in this document would entail changes, both editorial and substantive, to substantial portions of the existing Hazardous Materials Regulations (49 CFR, Subchapter C). However, it should be noted that these changes, if promulgated as regulations, would reduce the total volume of the HMR (currently, approximately 1250 pages) by at least 350 pages.

In a rulemaking project of this magnitude it is inevitable that errors and omissions will come to light subsequent to publication. If these errors and omissions are brought to RSPA's attention in a timely manner, it is likely that a supplementary notice of proposed rulemaking will be issued, to make corrections, as soon after publication of this document as is practicable.

Preamble Outline

I. Background

The Hazardous Materials Regulations (HMR), issued under authority of the Hazardous Materials Transportation Act (Public Law 93–633; 49 U.S.C. app. 1801 *et seq.*), are found in the Code of Federal Regulations (CFR), Title 49, Subchapter C, which is comprised of Parts 171 through 179. Subchapter C occupies approximately 1250 pages of the CFR. The two largest parts of Subchapter C are Part 173, entitled *SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS,* of about 330 pages, and Part 178, entitled *SHIPPING CONTAINER SPECIFICATIONS,* of about 420 pages. Part 171 of Subchapter C contains administrative information on the HMR, including definitions. Part 172 contains the Hazardous Materials Table of about 2700 entries, the Optional Hazardous Materials Table, and the rules applying to hazard communication by means of shipping papers, package marking, package labeling, and the placarding of transport vehicles.

Part 173 contains the definitions for each of the HMR's 22 hazard classes and the packaging requirements, both specification and non-specification, for all hazardous materials. Parts 174, 175, 176 and 177 contain additional requirements for carriage by rail, air, water and highway, respectively. Part 178 contains the construction specifications for all of the DOT specification packagings, except rail

tank cars, and Part 179 contains the specifications for tank cars.

As new materials with hazardous characteristics have been developed and produced, and as advances in technology have produced new packaging methods, the number of specification packagings has grown until at present they occupy, as previously noted, about 420 pages of the CFR. The specification packaging sections of Part 178 cover packagings required for various hazardous materials. These packagings range from small polyethylene bottles to cargo tanks. However, the major portion of Part 178 is devoted to specifications for non-bulk packagings, having authorized capacities of 110 gallons or less, and includes approximately 100 specifications for carboys, drums, barrels, boxes, cases, trunks, tubes, bags and various sorts of containers designed to be enclosed by larger containers. Not included in these 100 specifications are the specifications for cylinders for compressed gases and packagings designed solely for radioactive materials, none of which are addressed in this proposal. Compliance by packaging manufacturers with all requirements of the packaging specifications is mandatory, and shippers must ship in DOT specification packaging when required by the HMR.

Typical specifications found in Part 178 have requirements for materials of construction, thickness, fastenings, capacity, coatings, openings, joinings and carrying devices. Much of the information contained in a specification is given in great detail and is repetitious. For example, there are fourteen specifications for wooden boxes. Most wooden box specifications list each acceptable type of wood from which the box must be constructed. This list may be repeated in the next specification for a similar, but slightly different box. In addition to listing the acceptable types of wood, the regulations also specify the thickness and width of boards, kinds and dimensions of nails, and spacing of nails used in joining the box.

Many of these DOT specification packagings are obsolete or little used. They are too expensive to make or too labor-intensive to pack. On the other hand, new packagings for hazardous materials are being constantly developed. Since they are not included in the DOT specifications (Part 178), new or innovative packagings for hazardous materials only may be used under the terms and conditions of exemptions issued by DOT granting a person relief from applicable portions of the HMR. The administration of the exemptions program is very labor-intensive for exemption applicants and for DOT since an exemption application containing much detailed information on a new packaging (including a safety analysis) must be prepared by the applicant and must be carefully analyzed by DOT (including publication in the **Federal Register**) before it is granted or denied. In addition, an exemption must be renewed every two years, and this requires additional resource expenditures by both applicants and DOT.

In contrast to the DOT system of detailed specifications for packaging construction is a system of performance-oriented packaging standards that has been developed in the form of Recommendations by the United Nations Committee of Experts on the Transport of Dangerous Goods (U.N. Recommendations). These standards address the same types of non-bulk containers (drums, barrels, boxes, bags, carboys and inside containers or receptacles) as the DOT specifications. Typically, these standards have general requirements for materials, construction and a maximum capacity. For example, the U.N. 1A1 steel drum must have welded seams if it is to carry liquids, welded or mechanically seamed chimes, a maximum opening size of 7 centimeters (2.75 inches) and a maximum capacity of 450 liters (118.9 gallons). There are additional requirements for rolling hoops if the drum capacity is greater than 60 liters. Aside from these very general construction requirements, the strength and integrity of the drum are established by a series of performance tests which the drum must either pass or be capable of passing before it is authorized (as indicated by marks to be placed on the drum) for the carriage of hazardous materials; hence, the term "performance-oriented packaging standards". For drums, the principal tests are drop tests, hydraulic and leakage (or "leakproofness") tests and stacking tests. The height specified for the drop test in the U.N. system is determined by the "Packing Group" of the hazardous material to be transported. Within most hazard classes, the U.N. system segregates hazardous materials into three distinct "Packing Groups" based on the relative danger of the materials. Packing Group I consists of very dangerous materials. Packing Group II consists of materials considered to present moderate danger. Packing Group III consists of materials presenting minor danger. The U.N. 1A1 steel drum would have to survive a drop test of 1.8 meters (5.91 feet) if it were to carry a material in Packing Group I, 1.2 meters (3.94 feet) for Group II materials and 0.8 meters (2.62 feet) for Group III materials. This assumes the specific gravity of the materials does not exceed 1.2. For more dense materials, the drop height or density of the test material would be correspondingly increased.

Within the broad and general construction requirements of these performance-oriented standards, drum manufacturers are free to exercise their design and production ingenuity to produce packagings which are both cost-effective, as determined by the marketplace, and safe, as determined by the performance standards which they meet.

The U.N. Recommendations are not regulations and, in general, do not assign packagings to individual hazardous material. The U.N. system envisions that requirements (i.e., regulations) issued by national or international bodies and addressing one or more modes of transport (highway, rail, air or water) would cover the definitive requirements, tying a particular packaging or packaging system to an individual hazardous material. At present, there are two international (worldwide) modal hazardous material regulatory systems in place, one under the auspices of the International Maritime Organization (IMO) and the second under the International Civil Aviation Organization (ICAO). The IMO system is known as the International Maritime Dangerous Goods Code (or IMDG Code) and the ICAO system is known as the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air. Shipments of hazardous materials (both international and within the U.S.) are at the present time authorized (with certain exceptions) to be shipped under the ICAO system as fully equivalent to the HMR provided that the trip involves transportation by aircraft and motor vehicle only. (See 49 CFR 171.11.)

Thus, there are at present, the U.S. domestic requirements for hazardous materials transportation as found in the HMR, characterized by very precise specifications for the construction of hazardous materials packagings and, on the other hand, an international system based on performance-oriented standards for packagings. The issue which arises from this dichotomy is whether the U. S. should continue to use the well-developed domestic system which has been operating in the U.S. for many years or whether the U.S. should make some accommodation in the interest of international trade by

adopting the emerging international system in whole or in part. If the answer is to make some accommodation with the international system, the issue which must then be addressed is to what extent the international system should be implemented. How much of the DOT system should be abandoned to be replaced by rules based on the U.N. Recommendations?

RSPA is considering extensive amendments to the HMR. Under this proposal, the present domestic regulations would in large part be replaced by rules based on the U.N. Recommendations. The goals of this effort are to: (1) simplify the Hazardous Materials Regulations for both bulk and non-bulk shipments; (2) significantly reduce the volume of the regulations; (3) provide for greater flexibility in the design and construction of many hazardous materials packagings in order to recognize technological advancements; (4) promote safety in transport through the use of better packaging; (5) reduce the need for exemptions; and, (6) facilitate international commerce, including commerce between the United States and Canada.

The simplification of the HMR is a most important goal of this proposal. The existing regulations have their origin in the early efforts of the transportation industry to protect its personnel and equipment from materials with dangerous properties. Some container specifications go back to the early days of this century. The regulations were developed in a piecemeal fashion with recurring adjustments to take care of particular problems. Individuals subject to the HMR have complained that they are so complicated in both content and organization as to be almost unusable except by someone with extensive training or experience. In addition, the complexity of the HMR may penalize the small business person, whether shipper or carrier, who has insufficient hazardous materials business to justify employing an expert in the regulations.

Industry is not the only place where the complexity of the HMR imposes a burden. A staff of nine hazardous materials specialists at RSPA spend approximately half of their time giving explanations of the HMR either in writing or over the telephone. With large numbers of new shippers entering the field because of EPA requirements for hazardous substances and hazardous waste shipments, and with state enforcement of DOT's requirements increasing as states adopt the HMR, the number of these inquiries is increasing. One of the principal reasons for this Notice of Proposed Rulemaking (NPRM) is to simplify both shipper requirements and the packaging specifications by the adoption of rules based on the U.N. Recommendations, including performance-oriented packaging standards.

Another reason for considering a shift to performance-oriented packaging standards is to provide greater flexibility in the requirements for the design, construction and use of packagings having capacities of less than 450 liters. The current DOT packaging specifications are very detailed and are not readily adaptable to innovations in packaging technology. The use of an improved packaging which does not meet a detailed specification is prohibited until the specification is amended or an exemption is issued. This imposes a costly burden on both the industry and government, with an uncertain benefit in safety.

In addition, international trade would be facilitated by this proposal. Through both law and policy, it has been decided that standards-related activities shall not be a barrier to trade. Title IV of the Trade Agreements Act of 1979 (Public Law 96–39) addressing technical barriers to trade states in pertinent part:

> No Federal agency may engage in any standards-related activity that creates unnecessary obstacles to the foreign commerce of the United States. * * *. Each Federal agency, in developing standards, shall take into consideration international standards and shall, if appropriate, base the standards on international standards * * *. Each Federal agency shall, if appropriate, . . develop standards based on performance criteria, such as those relating to the intended use of a product and the level of performance that product must achieve under defined conditions, rather than on design criteria, such as those relating to the physical form of the product or the types of material of which the product is made.

The United States' position on the international scene has been to promote a worldwide system of consistent modal and regional transportation requirements to ensure that, insofar as is practicable, hazardous materials shipments move freely and safely between the various modes and regions of the world. Strong U. S. participation in the development of international standards is also essential to the economic interests of the U.S. domestic hazardous materials industry. Application of international standards by governments throughout the world has a direct impact on U.S. shippers and carriers involved in international trade. The Department of Transportation supports this uniform, global approach to the safe transportation of hazardous materials through participation in the work of five international organizations. These organizations are:

(1) *The United Nations Committee of Experts on the Transport of Dangerous Goods,* and its subsidiary bodies, the Group of Experts on Explosives and the Group of Rapporteurs. This committee is the focal point of international activity regarding the transport of packaged hazardous materials (except radioactive materials) and promulgates the U.N. Recommendations. RSPA is the agency charged to represent the U.S. on this committee and on its subsidiary bodies.

(2) *The International Maritime Organization (IMO).* IMO is a specialized agency of the United Nations concerned primarily with the promotion of safety in shipping and the prevention of marine pollution from ships. The U.S. participates in the work of the IMO through the U.S. Department of State's Shipping Coordinating Committee (SHC). The U.S. Coast Guard provides the majority of technical expertise to SHC and, with RSPA, represents the Department of Transportation at sessions of the IMO's Subcommittee on the Carriage of Dangerous Goods (CDG). The CDG Subcommittee publishes and maintains the International Maritime Dangerous Goods (IMDG) Code. This Code is recognized as the worldwide standard for transportation of packaged hazardous materials by vessel.

(3) *International Civil Aviation Organization (ICAO).* The Dangerous Goods Panel (DGP) of ICAO was established to develop an Annex 18 to the Chicago Convention on International Civil Aviation. The implementing regulations to Annex 18, the ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air, are recognized worldwide. RSPA represents the U.S. on the DGP, with technical expertise provided by the FAA.

(4) *Economic Commission for Europe (ECE) Group of Experts on the Transport of Dangerous Goods.* The ECE Group of Experts is responsible for updating and revising the European agreements concerning the carriage of Dangerous Goods by Road (ADR) and meets jointly at least once a year with the body responsible for updating the International Regulations concerning the Carriage of Dangerous Goods by Rail (RID) to ensure consistency between the two sets of regulations. RSPA participates in these meetings.

(5) *The International Atomic Energy Agency (IAEA).* The IAEA is an

intergovernmental body chartered to foster the peaceful contribution of nuclear energy to mankind. The IAEA has developed a regulatory system to help ensure the safe international transportation of radioactive materials. RSPA serves as U.S. Competent Authority to the IAEA.

The following international systems of regulations have been promulgated by these organizations and are based on the U.N. Recommendations:

(1) ICAO Technical Instructions—international—worldwide, fully recognized by the HMR.

(2) IMDG Code—international—worldwide, conditionally recognized by the HMR.

(3) RID—international—regional, European rail rules.

(4) ADR—international—regional, European highway rules.

In addition, at least two nations, Canada and Australia, have implemented national systems based on the U.N. Recommendations.

The regulatory bodies issuing these rules have included plans for terminating transitional or "grandfather" provisions which will render non-U.N. packagings (including DOT's) unacceptable for transport in the modes which they regulate. Most of these "grandfather" provisions end on December 31, 1989. After that time, hazardous materials classed, described and packaged according to the present HMR will only be able to move in domestic U.S. commerce.

Since January 1, 1983, the HMR (at § 171.11) have allowed shippers to use the ICAO Technical Instructions for the shipment of hazardous materials domestically and internationally as long as the journey included some transportation by aircraft. Travel by highway transport to or from the air leg of the journey is permitted under the ICAO rules. Since ICAO fully incorporates the U.N. Recommendations (hazardous material table, hazard classing, packaging standards, and performance tests), U.S. carriers are using it, and enforcement personnel are seeing U.N.-type shipments in domestic transportation. Indeed, some U.S. air carriers are no longer accepting hazardous material shipments tendered under the Title 49 rules and are accepting only shipments conforming to ICAO. Thus, shippers and carriers who wish to be in compliance with the regulations and enforcement personnel charged with enforcing the regulations are already faced with the task of learning both systems.

II. The ANPRM

On April 15, 1982, RSPA published an Advance Notice of Proposed Rulemaking (ANPRM), Notice Number 82-3, entitled: *Performance-oriented Packaging Standards*, Docket HM-181 (47 FR 16268). The goals stated in that notice were to explore the possibility of: (1) Simplifying the Hazardous Materials Regulations, (2) reducing the volume of the regulations, (3) providing greater flexibility in the design and construction of hazardous materials packaging to accomodate advances in packaging technology, (4) promoting safety in transport through the use of better packagings, (5) reducing the need for exemptions, and (6) facilitating international commerce, including commerce between the United States and Canada. In the ANPRM, a packaging system based on the U.N. Recommendations was advanced, using the flammable liquid hazard class for demonstration purposes. The proposal referenced non-bulk packaging requirements for flammable liquids in terms of U.N. packagings rather than existing DOT specifications (for example, a drum reference would be made to a U.N. 1A1 drum rather than a DOT-17E drum). In addition, the ANPRM contained the current U.N. packaging standards for drums, barrels, jerricans, boxes, bags and various other containers. The ANPRM also contained the U.N. performance tests which the packagings must pass. These tests were taken directly from the latest issue of the U.N. Recommendations. However, the U.N. Recommendations do not include a compatibility test for plastic packagings, although they make provision for one. A compatibility test for plastic packagings developed by RSPA was included in the subpart of the ANPRM devoted to testing. The ANPRM also contained packaging provisions for bulk packagings (cargo tanks, portable tanks and tank cars) for flammable liquids, but these provisions came from the HMR rather than the U.N. Recommendations since the U.N. Recommendations generally do not cover bulk shipments.

The ANPRM produced about 95 comments from shippers, carriers, packaging manufacturers, trade associations and interested individuals. They ranged across the entire spectrum from enthusiastic support to total opposition. In general, shippers who engage in international commerce strongly supported the concept. A majority of the commenters supported the proposal with reservations.

RSPA has prepared a detailed analysis of the comments on the ANPRM. This analysis is included as part of a Regulatory Evaluation prepared for this NPRM and is available for examination in the Docket. Persons interested in RSPA's analysis and disposition in detail of all the issues raised in the comments are referred to that document. The major issues raised in the comments are discussed below.

It should be noted that in the ANPRM (as in this NPRM) RSPA included in its proposed amendments a consolidation and simplification of its bulk packaging requirements as well as non-bulk, even though the U.N. Recommendations do not address bulk packaging other than portable tanks and intermediate bulk containers. However, RSPA is proposing no substantive changes to portable tank, cargo tank or tank car specifications in this Docket. Some of the comments directed at the bulk packaging provisions of the ANPRM do not bear directly on the issue of the U.N. Recommendations.

The greatest number of objections to the proposals in the ANPRM were directed at four areas: (1) Retention of existing HMR requirements; (2) the inadequacy of the U.N. testing regime; (3) U.N. standards for steel drums; and (4) U.N. standards for fiberboard boxes. These specific issues will be dealt with below.

The ANPRM, in a section entitled "Transition", discussed at length the problems which would arise should a change be made from the present HMR to rules based on the performance-oriented packaging standards contained in the U.N. Recommendations. The need for a transition period was discussed, and the ANPRM solicited ideas from the commenters on how long this transition period should be.

Many commenters recommended that the present HMR be retained as an alternative packaging system to any new regulations based on the U.N. Recommendations for a period of time varying from three years to perpetuity. This suggestion, that the present HMR be retained, generally envisioned that DOT would not continue to publish "grandfathered" regulations in the Code of Federal Regulations (CFR). They might be published privately by one of the nongovernment entities, such as the Bureau of Explosives, which presently publishes the HMR as a private tariff, or the Bureau of National Affairs. There is precedent for this since the National Tank Truck Carriers presently publish obsolete cargo tank specifications (such as the MC 300, MC 303, MC 305, MC 310, MC 330, etc.) which DOT stopped printing a number of years ago, but which are still authorized for use. The

scenario envisioned by these commenters is that the existing HMR provisions would be available as an alternative to a new DOT system based on the U.N. Recommendations, but that DOT would not maintain or amend them. Thus, DOT would not have to expend any resources keeping the old regulations current. The use of the existing HMR as an alternative system and the period of time that such use was allowed would constitute the mechanism for transition and the period for transition envisioned in the ANPRM.

A considerable number of commenters raised a question as to whether the performance tests required for packagings in the U.N. system are adequate to assure safety in transport. In particular, the absence of a vibration test and the low pressure levels required for the U.N. leakproofness test for liquid packagings were noted as shortcomings of the U.N. system. The leakproofness test level in the U.N. Recommendations for Packing Group I materials is 30 kilopascals (4.4 pounds per square inch gauge) and for Group II and III materials is 20 kPa (2.90 psig) for material of normal vapor pressure. The comparable test for the most common DOT packaging (17E drum) is 7 psig (48.3 kPa).

A number of commenters speculated as to differences between the transport environments of Europe and the United States as justification for adding tests in Docket HM–181 over and above those presently in the U.N. Recommendations. In the U.S., coast-to-coast hauls of truckloads or railcars of packagings representing 50 or more hours of continuous vibration are commonplace—a situation which commenters claimed would be highly unlikely in Europe. Some commenters felt that the present U.N. performance test series of drop, stacking and leakproofness tests would not be sufficient to replicate the exposure of packagings to abrasion and fatigue stresses that long distance hauls by rail and highway exert on packagings in this country. On the other hand, some complained that the U.N. tests are too severe—especially users and manufacturers of fiberboard boxes.

DOT received a number of comments on the adequacy of the steel drums which would be allowed under a system based on the U.N. Recommendations. The steel drum, usually in 55 gallon size, is probably the most popular non-bulk packaging for liquid hazardous materials, especially flammable liquids. The DOT–17E tight head is the most popular of the DOT specification drums. It is authorized for most flammable liquids in all 18-gauge construction (nominal thickness 0.0478 inches or 1.214 millimeters) and with 18-gauge heads and 20-gauge body (0.0359 inches or 0.912 millimeters) for flammable liquids with flash points above 20 °F (−6.7 °C). DOT has received petitions to allow all 20-gauge drums with triple-seamed chimes (present U.S. manufactured drums use double-seamed chimes) to be used for hazardous material service. These petitions requested that triple-seamed 17E drums with bodies of 20-gauge steel and heads of 18-gauge steel be authorized for flammable liquids with flash points at or below 20 °F, and that triple-seamed 17E drums of all 20-gauge construction be authorized for flammable liquids with flash points above 20 °F. The petitions resulted in an ANPRM, HM–182, which appeared in the Federal Register of June 10, 1982 (47 FR 25167). The reader is referred to that notice for more detailed discussion of these issues.

Comments received on HM–182 are pertinent to HM–181 because, if the petition were granted, all 20-gauge triple-seamed drums would in all likelihood appear as an authorized packaging under rules proposed in the ANPRM. All matters addressed in HM–182 are being handled in this rulemaking. Unlike the present DOT specifications, the U.N. packaging standards do not mention metal thickness. Packagings to be authorized must only meet the very general requirements of the packaging standards and then satisfy the performance tests. When a double-seamed drum fails a drop test, it usually fails at the chime. However, a triple-seamed 20 gauge drum will probably pass the 1.8 meter (5.91 feet) drop test for Packing Group I materials with specific gravities less than or equal to 1.2. Even thinner gauge drums may well pass the lower drop heights associated with Group II and III materials. A number of commenters on both HM–181 and HM–182 questioned whether these thinner walled drums, which would be allowed under a system based strictly on the U.N. Recommendations (because triple seaming would eliminate chime failures in the drop tests), could stand up to the rigors of the U.S. transportation environment. These commenters believed that vibration would place abrasion and fatigue stress on the drums and that they would prove to be unsatisfactory in spite of their ability to survive a drop test. Comments received in HM–182 from shippers and carriers purporting to have had shipping experience with non-hazardous materials service in all 20-gauge drums were conflicting. Some commenters reported good experience, but others reported significant problems. It should be noted that these 20-gauge drums were, in general, not constructed to either DOT specifications or U.N. standards.

In addition to the issue of whether the U.N. testing procedures are adequate to assure safe performance of packagings in the U.S. transportation environment, another issue has been raised in regard to the light drums which would be allowed under a U.N. based system. The present DOT regulations provide for the following categories of drums based on their reusability: (1) Fully reusable with no restrictions, (2) non-reusable and (3) reusable after reconditioning. The first category generally consists of heavy gauge drums, often of high cost alloys such as nickel, monel, or stainless steel, that are often in dedicated service (i.e., are reused by one shipper for a specific commodity). They may be reused for hazardous materials transport for materials for which they are authorized without restriction. The DOT–5 series drums are in this category. The second category contains lightweight drums which are not approved for general reuse (except as outlined in § 173.28 for waste materials) in the transport of hazardous materials. They are marked "STC" (single-trip container) or "NRC" (non-reusable container). The DOT–37 series drums and some DOT–17 series drums are in this category of drums. The final category contains drums which may be reused after reconditioning. These are the DOT–17C, 17E and 17H drums and they are marked STC in addition to the DOT specification number. These latter drums may be reconditioned, as authorized by § 173.28, and reused for the transport of hazardous materials for which they are authorized as if they were new drums.

An industry devoted to reconditioning drums exists, and DOT–17 series drums marked "STC" which are in good condition have a salvage value for reconditioning. The reuse (or recycling) of these packagings, if properly carried out, has benefits to society in the form of savings in energy and natural resources over the manufacture of new drums. The National Barrel and Drum Association (NABADA), a trade association representing the reconditioning industry, commented on HM–181 and HM–182. In their comments on HM–181, NABADA and individual drum reconditioners maintain that lightweight (i.e., 20 gauge) drums designed to pass the U.N. drop tests cannot be successfully reconditioned because their walls are too thin to stand the cleaning, dedenting

and other processes involved in drum reconditioning. They further maintain that the lightweight drums will drive the reconditionable drums from the market and that the benefits to society which accrue because of the reconditioning of drums will be lost. In other words, they maintain that using a hazardous material transportation regulatory program based only on the U.N. Recommendations will place on society the additional environmental and energy costs which will appear when drum reconditioning ceases.

This argument leaves some questions unanswered. If the 18 gauge DOT drum can be reused and, therefore, has a salvage value, it should have an economic advantage over the lighter gauge drum. The lightweight drum would not only have no salvage value but, as NABADA has pointed out, since it would probably have to be disposed of as a hazardous waste after its use, it would become a definite liability to its owner. The NABADA argument also ignores the existence of nonhazardous material service for reconditioned drums. Thus, commenters did not satisfactorily explain how the continued use and availability of reconditioned drums is threatened.

The ANPRM did not include specific provisions for the reconditioning of packagings. However, it did include provisions for the marking of reconditioned packagings (see § 178.504(c)). These provisions come directly from the U.N. Recommendations (see paragraph 9.5.4 of Chapter 9); so the U.N. envisioned the reconditioning and reuse of packagings, but is silent (except for the requirement that they be able to pass performance tests) on the requirements for reconditioning. One suggestion put forward by NABADA (and other commenters) as a solution to the dilemma of the disappearance of reconditionable drums was the suggestion that the existing HMR be continued indefinitely as an alternative to a U.N.-based system. How such a dual system would solve the alleged problem of light drums replacing heavy ones (which is pictured by NABADA as the natural consequence of economic selection) is unclear.

Another area of extensive comment on the ANPRM concerned fiberboard boxes. The most common DOT specification fiberboard boxes are the DOT-12 series. Of these, the DOT-12B is the most widely used. It is used for hazardous liquids with inner packagings consisting of bottles made of glass or plastic, or metal cans. These inner packagings have a capacity ranging from a few ounces to 5 gallons. A typical and very common packaging of this type consists of 4 one gallon cans of paint with friction lids packed in a fiberboard box. An estimated 300 million one gallon cans of paint subject to the HMR are shipped every year.

Comments received on the ANPRM indicate that the requirements for fiberboard boxes under the U.N. system produce a packaging that is both more substantial and more costly than the 12B. This is because under the U.N. system, the completed packaging (fiberboard box plus the inner receptacle) must survive a drop test of 1.8, 1.2 or 0.8 meters, depending on whether the hazardous material to be packed falls into Packing Group I, II or III. By contrast, the DOT specification for the 12B box (§ 178.205) requires tests for fiberboard strength but a drop test of the completed package is not required except for special boxes. RSPA has had a number of tests run on various configurations of the 12B box with inner receptacles for liquids, and several commenters provided additional test results on this type of packaging. Results of the tests are available from the RSPA.

In general, it may be said that the 12B, when packed with frangible inner packagings (glass, etc.), did not perform well in drop tests. While the smaller sizes (pints) survived the lower (Packing Group III) drops, the larger size bottles (gallons) would not survive these, and neither would survive the Group I test. The survival rate for small sizes was moderate with the intermediate (Group II) tests.

Metal cans with screw closures packed in the 12B style box performed much better than glass bottles because of their ability to accept some deformation without fracturing. However, friction-closed metal cans in the larger sizes (one-gallon paint cans) would often fail the drop tests when their lids popped open.

Unlike the issue of U.N. 1A1 drums vs. DOT-17 series drums, involving claims that the U.N. packaging was not as substantial as the DOT one, in this instance it is plain that the U.N. 4G fiberboard box, with inner packagings, which must survive a Group I, II or III drop test, must be appreciably more substantial than the DOT-12B. The response of many commenters to the U.N. 4G box standard contrasted with comments on the U.N. 1A1 drum standard. Although the various drop tests (with varying heights depending on whether the material was in Packing Group I, II or III) were considered too lax for testing drum performance, many commenters considered them too severe for box performance. The 12B was cited as a proven package based on the historical use of millions of shipments annually using this package. The fact that it performed badly in the array of U.N. tests was dismissed or not commented on.

The present incident reporting requirement of § 171.16 does not require reporting of spills of paint or electrolyte from batteries. The paint industry was one of the major commenters on the performance of metal cans packed in fiberboard boxes. It is not possible to look at the spillage record of these packagings since that commodity is excepted from detailed reporting. However, an analysis of DOT's hazardous materials incident reports for other materials shipped in fiber-board boxes was made (see the Regulatory Evaluation) which showed that "Dropped in handling" was by far the most prevalent failure mode, accounting for about half of all incidents involving fiberboard packagings.

The final area of extensive comment (although not nearly as extensive as the issues of drums and fiberboard boxes) was paper bags. The Paper Shipping Sack Manufacturers' Association (PSSMA) believes that the multiwall bags presently specified in the DOT specification (44B, 44C, 44D and 44E) are safer than those meeting the requirements of the U.N. Recommendations (U.N. 5M1 and 5M2), and that the adoption by the U.S. of a regulatory system based on the U.N. Recommendations would result in cheaper, lower quality multiwall bags displacing the present DOT specifications packagings (which easily meet the U.N. standards). PSSMA believes that safety would suffer as a result.

A large class of hazardous materials shipped in multi-wall bags consists of agricultural chemicals—in particular, nitrate fertilizers such as ammonium nitrate and nitrate of soda. These materials are classed as "Oxidizers" by DOT and the U.N. DOT's present rules for this class of materials are found at 49 CFR 173.182. They do not require the use of a DOT specification packaging (i.e., bags) but describe two non-specification bags, one of four ply for up to 110 pounds and one of three ply for up to 80 pounds. The description of these two bags, including performance tests, is very similar to the U.N. standards of the U.N. 5M1 and 5M2 bags, with the exception that the U.N. bags would have to have the U.N. certifying marks while the nitrate bags described in § 173.182(b)(5) are not marked since they are not DOT specification packagings.

It would appear that the purported problem feared by the PSSMA on the adequacy of the U.N. packagings would have appeared before now if these nitrate bags posed a significant problem. An examination of incidents since 1972 in the DOT incident reporting system reveals 127 incidents and two minor injuries involving ammonium nitrate and sodium nitrate in paper bags.

In the course of meetings in Houston, Texas on April 29, 1982, and St. Louis, Missouri on September 14, 1982, the Docket HM–181 ANPRM was discussed. Commenters suggested that additional tests (such as vibration and higher levels of leakproofness) over those specified in the U.N. Recommendations be incorporated into whatever system the U.S. adopts. Since the U.N. document is only a set of recommendations which provides a general framework around which individual countries or other regulatory bodies are free to design their own regulatory systems, there is nothing to prevent DOT (as the Competent Authority for the U.S. in regulating the transportation of hazardous materials) from incorporating additional tests in proposed or final rules. However, the U.S. is only able to apply these more stringent rules to domestic shippers or packaging manufacturers. To apply them to foreign packagings may invite retaliation or complaints that the U.S. was using the regulations as non-tariff barriers to trade in violation of the Trade Agreements Act since they are more stringent than the U.N. requirements. Thus, we would have the situation where the U.S. would be applying more stringent requirements against U.S. shippers and manufacturers than against imported shipments. This situation would defeat one of the objectives of incorporating the U.N. Recommendations, which is international reciprocity. At both the Houston and St. Louis meetings, DOT raised this point and specifically requested comments on whether or not this would place the U.S. at a competitive disadvantage. RSPA received no written or oral comments on this point and can only assume that it is not envisioned as being a problem.

RSPA has carefully considered the points raised in the comments on its ANPRM and reexamined the objectives stated in that document. A Regulatory Evaluation was prepared which looked at the options open to RSPA in light of the comments and events (both national and international) which have happened since then. The reader is referred to the Regulatory Evaluation in Docket HM–181 for a detailed discussion of the available alternatives. After carefully considering these options, RSPA has decided on the following course of action.

(1) Proceed to develop and publish an NPRM under Docket HM–181.

(2) Retain the six objectives stated in the ANPRM.

(3) Expand the scope of the proposal beyond what was contained in the ANPRM (packaging) to incorporate the U.N. hazardous materials table, the U.N. system of classing, including hazard class definitions and packing groups, and to incorporate some of the communications requirements from the U.N. system.

(4) Retain and expand the effort to systematize, simplify, and enhance the safety provisions of the bulk packaging requirements in the HMR.

(5) Set minimum thickness requirements for the reuse of metal and plastic packagings.

(6) Establish a transition period of 5 years for continued use of existing regulatory provisions, particularly with regard to use of non-bulk packagings and hazard communication requirements.

III. Related Rulemakings

From the publication of the ANPRM on April 15, 1982 until the present time, RSPA has been analyzing comments, preparing a regulatory evaluation, deciding on a course of action and drafting an NPRM. During this period of time, many issues have arisen which required either acknowledgement and postponement or regulatory action. The relationship between Docket HM–181 and these related rulemaking proposals is discussed below.

A. Docket HM–181A

At the time that RSPA began considering the desirability of issuing performance-oriented packaging standards to replace the packaging specifications found in the HMR, it was apparent that explosives would be a major part of any such effort. RSPA's requirements for testing and classing explosives are outdated and many of the packagings are obsolete. Because the size of any regulatory project covering the classing and packaging of explosives is so great, and because the testing, classing and packaging of explosives is so specialized, RSPA decided to handle explosives in another rulemaking action which will be issued under Docket HM–181A. Work has begun on that project and an NPRM will be issued sometime after publication of this notice.

Several areas for this rulemaking address requirements for explosives or have an impact on them. Shipping descriptions (i.e., shipping names, numerical hazard classes, and identification numbers) for explosives, based on the U.N. Recommendations, appear in the § 172.101 Table. In Subpart E of Part 172 it is proposed to replace the EXPLOSIVE A, B, C and BLASTING AGENT labels with the EXPLOSIVE 1.1, 1.2, 1.3, 1.4, and 1.5 labels. In Subpart F of Part 172 it is proposed to replace the EXPLOSIVE A and B and BLASTING AGENT placards with the EXPLOSIVE 1.1, 1.2, 1.3, 1.4, and 1.5 placards. In Part 178, it is proposed to delete certain packagings used for explosives, such as Specification 23G (special cylindrical fiberboard box for high explosives). It should be understood that these proposals may be modified in Docket HM–181A, and will be given consideration under that docket. They appear in this rulemaking for the sake of completeness only. It is recommended that commenters desiring to address provisions for explosives await publication of Docket HM–181A before submitting comments.

B. Docket HM–182

In January, 1982, RSPA received a petition from Inland Steel Container Company to amend the HMR to allow all 20-gauge drums with triple-seamed chimes to be constructed in the 55 gallon size under the DOT–17E specification. The petition requested that those materials currently authorized to be shipped in a 17E drum with 18-gauge heads and 20-gauge bodies (18/20), be authorized in the all 20-gauge triple-seamed drum, and that materials authorized in the all 18-gauge 17E drum be authorized in the 18/20-gauge triple-seamed drum. RSPA published an ANPRM under Docket HM–182 on June 10, 1982 (47 FR 25167), to deal with this issue. It should be noted that drum manufacturers generally agree that triple-seamed drums, all 20-gauge, can pass the U.N. performance tests, including the drop test, at the performance levels of Packing Groups I, II, and III.

After reviewing the comments received on both the NPRM under Docket HM–182 and the ANPRM under Docket HM–181, RSPA decided that the issue of triple–seamed drums was so intertwined with that of performance-oriented packaging that Docket HM–182 should be incorporated in Docket HM–181. That has been done and the comments on the two dockets have been combined. No further notices will be issued under Docket HM–182.

C. Docket HM–185

On August 26, 1982, RSPA published an NPRM under Docket HM–185 (47 FR 37592) which proposed standards for polyethylene containers. A final rule under that Docket was published on June 14, 1984 (49 FR 24684). The final rule revised the HMR by establishing standards for polyethylene packagings in sizes up to 55 gallons. Previously, most of these packagings had been authorized only under the terms of exemptions. The most important feature of HM–185 was that it established compatability and permeation testing for polyethylene packagings (see § 173.24 and Appendix B to Part 173). The ANPRM under Docket HM–181 had proposed such tests (see § 178.608 of the ANPRM). The tests proposed in § 178.608 were based on RSPA's judgment of what was required at the time. Comments received on the tests proposed in the ANPRM and in the NPRM under Docket HM–185 led RPSA to modify both test methods and pass-fail criteria. The compatability and permeation tests contained in this proposal are essentially those which presently exist in the HMR and appeared in the final rule under Docket HM–185. It should be noted, however, that in this proposal they are placed in Part 178 with other performance-oriented tests.

D. Docket HM–194

On October 12, 1984, RSPA published an NPRM under Docket HM–194, entitled *Designation of Testing Laboratories, United Nations Packagings* (49 FR 40056). It was followed by a final rule under the same docket on March 13, 1985 (59 FR 10060) and a corrections document on April 24, 1985 (50 FR 16089). This rulemaking established a procedure whereby testing agencies, upon application, could be approved by RSPA to certify the adequacy of packagings constructed to U.N. standards and marked as U.N. packagings. The purpose of the amendment was to allow manufacturers or users of U.N. hazardous materials packagings to have access to independent testing facilities which had been designated by DOT. The program is a voluntary one, and persons are free to use the option or not. It was set up because of a fear by some companies doing international business that without such a certification by an entity acknowledged by DOT, the U.S.-made packagings would not be accepted by some foreign governments. It was not the intent to replace self certification traditionally used by packaging manufacturers in the U.S. As of December, 1986, eight agencies have been approved by RSPA under this program.

E. Docket HM–196

On February 7, 1986, RSPA published an NPRM under Docket HM–196, entitled *Packaging and Placarding Requirements for Liquids Toxic by Inhalation* (50 FR 5270). It was followed by a final rule under the same docket on October 8, 1985 (50 FR 41092). This rulemaking was initiated after the tragedy in Bhopal, India involving the release of methyl isocyanate. RSPA realized that the regulatory controls which existed in the HMR for certain volatile liquids that were highly toxic by inhalation were inadequate. The rule imposed additional packaging and communication requirements for liquids which met the criteria for toxic by inhalation. The criteria selected were those which exist in the U.N. Recommendations for Division 6.1 at the Packing Group I level for inhalation toxicity.

Of particular interest in this proposal are the additional packaging requirements. Under Docket HM–196, not all packagings for inhalation toxic liquids were superceded, but many were. The new packagings, both bulk and non-bulk were not specified in the rule, but were to be approved by RSPA when proposed by a shipper of these materials. This notice proposes both bulk and non-bulk packagings for liquids toxic by inhalation, and is the first document to do so. It also proposes additional or improved requirements for gases which are toxic by inhalation, and "Inhalation Hazard" shipping paper and marking requirements for non-bulk packagings with primary receptacles of one liter or less.

F. Docket HM–145F

On October 17, 1986 the President signed into law the Superfund Amendments and Reauthorization Act of 1986. This Act amended the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA" or "Superfund"), and required that the Secretary of Transportation list and regulate hazardous substances listed or designated pursuant to section 202 of CERCLA. On November 21, 1986, RSPA published a final rule under Docket HM–145F, entitled *Hazardous Substances* (51 FR 42174). This rule listed and regulated as hazardous materials all hazardous substances designated under CERCLA and fulfilled DOT's requirements under the Superfund Amendments.

This rule listed all of the hazardous substances and their reportable quantities designated by the U.S. Environmental Protection Agency, in an Appendix to § 172.101. In addition, it removed the special notation in the § 172.101 Table (the letter "E" in column 1 and the "RQ" and quantities in pounds and kilograms from column 2). In essence, hazardous substances are now hazardous materials and no longer appear in the § 172.101 Table but now appear in the § 172.101 Appendix. This rule specified some additional requirements in selecting proper shipping names and in preparing shipping papers and marking packages. These changes are not reflected in this proposal. The reason is that Docket HM–145F was prepared in a very short time; the Department had 30 days from the time of the President's signature to implement the Amendments and did so in a final rule, not an NPRM. To have incorporated these sudden changes into this proposal would have caused considerable delays in its completion especially because the Table would have had to be revised. Readers should be aware of the fact that the amendments to the HMR which appeared in Docket HM–145F do not appear in, and have not been considered in, this proposal.

IV. Major Features of the NPRM

A. Format Improvements

The proposals contained in this document are intended to improve the format of the HMR, as follows:

1. The listing of matter incorporated by reference would be made easier to use. (See § 171.7.)

2. All authorized shipping names for hazardous materials would be consolidated into one Hazardous Material Table. (See § 172.101.)

3. Provisions of the IM (intermodal) Portable Tank Table would be incorporated into the HMR, eliminating the need to maintain this publication separate from the HMR. (See § 172.102.)

4. Throughout the HMR, quantities would be expressed in both international (e.g., metric units) and U.S. standard units.

5. The packaging sections in Part 173 would be reduced from approximately 427 to 242 sections.

6. The number of packaging specifications in Part 178 would be reduced from approximately 146 to 66. Approximately 100 specifications for non-bulk packagings would be eliminated and 20 new ones added.

7. The total volume of the HMR would be reduced by at least 350 pages, from 1250 pages.

B. Regulatory Features

Major regulatory features proposed in this document are as follows:

1. U.N. definitions for terms, such as "drum" and "packing group", would be added. (See § 171.8.)

2. The Hazardous Materials Table (see § 172.101) would be revised as follows:

(a) The Optional Table (§ 172.102) would be removed and shipping descriptions would be aligned with the U.N. Recommendations.

(b) The symbols "D" and "I" would be added to designate certain descriptions unique to domestic or international transportation (e.g., "combustible liquid, n.o.s." for domestic transportation).

(c) Numeric hazard classes would replace hazard classes described by words (i.e., "Class 3" instead of "flammable liquid").

(d) Most hazardous materials would be assigned packing groups to indicate their relative degree of hazard (e.g., "Packing Group I" indicates a high degree of hazard).

(e) A "Special Provisions" column would accommodate exceptions or additional requirements for specific materials and would be used to implement IM Portable Tank provisions into the HMR.

(f) Per package quantity limitations for transportation by aircraft would be aligned, generally, with the ICAO Technical Instructions.

(g) Vessel stowage requirements would be aligned with the IMDG Code.

3. A "Special provisions" section would be added. Special provisions would be a series of codes which would be explained in § 172.102. They would prescribe additional packaging requirements, IM portable tank authorizations, exceptions and modal specific requirements. (See § 172.102.)

4. Shipping paper requirements would be changed to conform to U.N. terminology (see Subpart C of Part 172):

(a) Class or division numbers would replace hazard classes described by words.

(b) The packing group would be required as part of the shipping description.

(c) Technical names would be required for "n.o.s." entries.

5. Marking requirements for packagings would be revised (see Subpart D of Part 172):

(a) Technical names would be required as part of the package marking for "n.o.s." entries on all non-bulk packages and on those bulk packages for which proper shipping name markings are required.

(b) Minimum size requirements (100 millimeters on tank cars, 75 millimeters on cargo tanks and 50 millimeters on other bulk packages) would be prescribed for markings on bulk vehicles.

(c) The requirement to mark "INHALATION HAZARD" on packages would be extended to bulk packages, to non-bulk packages having primary receptacles of one liter or less, and to packages containing poisonous gases.

6. Labeling requirements would be aligned with the U.N. Recommendations (see Subpart E of Part 172):

(a) Text (e.g., "FLAMMABLE LIQUID") on labels for Classes 2, 3, 4, 6.1, and 8 would be optional. Class numbers would be required on "no text" primary hazard labels.

(b) The EXPLOSIVES A, B and C, BLASTING AGENT, OXYGEN and IRRITANT labels would be removed.

(c) The EXPLOSIVES 1.2, 1.2, 1.3, 1.4 and 1.5, KEEP AWAY FROM FOOD (St. Andrew's cross) and INFECTIOUS SUBSTANCES labels would be added.

(d) Design provisions would accommodate existing DOT and U.N. label dimensions, where practicable.

7. Placarding requirements (see Subpart F of Part 172) would be revised as follows:

(a) Text on placards for Classes 2, 3, 4, 5, 6.1 and 8 would be optional.

(b) Placards conforming to the U.N. Recommendations or the TDG Regulations would be permitted in place of the corresponding DOT placards to accommodate any minor design differences.

(c) The EXPLOSIVES A, B and C, BLASTING AGENTS, OXYGEN, CHLORINE AND FLAMMABLE SOLID W placards would be removed.

(d) The EXPLOSIVES 1.1, 1.2, 1.3, 1.4 and 1.5, SPONTANEOUSLY COMBUSTIBLE, DANGEROUS WHEN WET and KEEP AWAY FROM FOOD placards would be added.

(e) Identification numbers would not be permitted on subsidiary hazard placards. They would be permitted on the POISON GAS placard.

8. General requirements applicable to packaging hazardous materials (see Subparts A and B of Part 173) would be revised as follows:

(a) For determining the classification of materials with multiple hazards, a precedence of hazards table from the U.N. Recommendations would be used. (See § 173.2a.)

(b) Packaging requirements would be enhanced with respect to compatibility, filling limits and closures on packagings. (See §§ 173.24, 173.24a and 173.23.)

(c) A base level vibration test performance standard would be added. (See § 173.24a and Appendix C to Part 173.)

(d) The metric equivalency provisions would be removed from § 173.27.

(e) Packaging requirements for transportation by aircraft generally would be based on the ICAO Technical Instructions. (See § 173.27.)

(f) Reuse of metal and plastic drums and composite packagings would be linked to minimum thickness requirements. Reuse of paper, textile, plastic film and fiberboard packagings would be prohibited. (See § 173.28.)

(g) The leak test from the U.N. Recommendations would replace the reconditioning provisions of § 173.28(m).

(h) General use requirements and restrictions for portable tanks, cargo tanks and tank cars would be aligned in a manner consistent with the proposals for cargo tanks under Docket HM-183 and 183A. (See §§ 173.24b, 173.31, 173.32, and 173.33.)

(i) Packaging equivalency provisions would be added to permit use of higher integrity portable tanks and cargo tanks where lower integrity tanks are specified. (See §§ 173.32 and 173.33.)

(j) General requirements for packaging extremely toxic materials in cylinders would be added. (See § 173.40.)

9. Hazard class definitions for materials other than explosives and radioactives would be consolidated into one subpart and revised. (See Subpart D of Part 173.)

(a) Compressed gases would be divided into Division 2.1 (flammable gases), Division 2.2 (non-flammable gases) and Division 2.3 (poisonous gases). Division 2.3 would be divided into Packing Group IA (LC50 less than or equal to 200 ppm), Packing Group IB (LC50 greater than 200 ppm and less than or equal to 1000 ppm), Packing Group II (LC50 greater than 1000 ppm and less than or equal to 3000 ppm), and Packing Group III (LC50 greater than 3000 ppm or less than or equal to 5000 ppm). (See § 173.115.)

(b) The flammable liquid upper limit would be changed from 100 °F (38 °C) to 60.5 °C (141 °F), consistent with the U.N. Recommendations. The combustible liquid definition would include materials with flash points above 60.5 °C and below 93.3 °C (200 °F), materials with flash points above 93.3 °C that are transported as liquids at or above their flash points and, for domestic transportation, materials with flash points between 38 °C and 60.5 °C (See § 173.120.)

(c) Class 4 definitions consistent with the U.N. prior to December 1986 would be adopted; Division 4.1 for flammable solids, Division 4.2 for spontaneously combustible materials, and Division 4.3

for dangerous when wet materials. (See § 173.124.)

(d) Existing DOT definitions for oxidizers (Division 5.1) and organic peroxides (Division 5.2), which are consistent with the U.N. Recommendations, would be retained. (See § 173.132.)

(e) For poisonous materials other than gases (Division 6.1), the U.N. criteria for toxicity, including packing group criteria, would be adopted. (See § 173.133.)

(f) A definition for infectious substances (Division 6.2) would be adopted which refers to the regulations of the Department of Health and Human Services, as does the present definition for etiologic agents, but which is generally consistent with the U.N. Recommendations. (See § 173.134.)

(g) No changes would be made to radioactive materials (Class 7) definitions.

(h) The U.N. criteria for corrosive materials (Class 8) would be adopted and the ORM–B hazard class would be eliminated. (See § 173.136.)

(i) The U.N. definition for miscellaneous hazardous materials (Class 9) would be adopted and the ORM–A and OMR–C hazard classes would be eliminated. (See § 173.140.)

(j) The ORM–D and ORM–E hazard classes would be retained. (See § 173.144.)

10. Non-bulk packaging authorizations and exceptions would be revised to align them with performance-oriented packaging standards. (See Subpart E of Part 173.)

(a) Limited quantity and consumer commodity exceptions would generally be limited to Packing Group II and III materials and to packages not exceeding 30 kilograms (66.1 pounds) gross weight. Other exceptions would be similar to existing provisions. (See §§ 173.150 through 173.156.)

(b) Packing Group III packaging requirements would be made applicable to most Class 9 materials, to all ORM–E materials, and to all Packing Group III materials, including those in Class 3 and Division 6.1.

(c) Packagings for most materials would be authorized by packing group and physical form of a material rather than by hazard class. Generic non-bulk packaging sections would be added for Packing Group I, III, and III liquids and solids. These sections would present arrays of performance-oriented packagings. (See §§ 173.201–203 and 173.211–213.)

(d) Packagings for organic peroxides (Division 5.2) would be based on Chapter 11 of the U.N. Recommendations. (See § 173.225.)

(e) Provisions for packaging liquids which are toxic by inhalation, based on approval provisions, would be added. (See §§ 173.226 and 173.227.)

(f) Provisions for packaging lithium batteries, based on exemption requirements, would be added. (See § 173.185.)

11. Bulk packagings authorizations would be revised. (See Subpart F of Part 173.)

(a) Packagings would be authorized based on degree of hazard rather than historical precedent.

(b) Bulk packagings provisions for materials toxic by inhalation, based on approval provisions, would be added.

(c) Provisions of the IM Portable Tank Table would appear in the HMR. (See § 172.102.)

(d) General requirements applicable to filling limits for bulk packagings would be added or clarified. (See § 173.24b.)

(e) The bulk transport of hydrogen peroxide in strengths of 8 to 52% would be regulated.

12. Part 178 would be revised to adopt packaging standards and tests based on the U.N. Recommendations.

(a) One hundred existing specifications for non-bulk packagings would be removed and twenty performance standards would be added. (See Subpart L of Part 178.)

(b) Performance tests based on Chapter 9 of the U.N. Recommendations would be added, to include a drop test, leakproofness test, hydrostatic pressure test, stacking test, cooperage test for wooden barrels and chemical compatibility test for plastic receptacles. (See Subpart M of Part 178.)

(c) Manufacturers would be required to notify persons to whom packagings are transferred of any specification requirements which have not been met at time of transfer and retain copies of the notification for a one year period. (See § 178.0–2.)

(d) Manufacturers would be required to repeat performance tests at least once each year and retain records of test results for a one year period. (See § 178.601.)

V. Review by Sections

A. Part 171; General Information, Regulations, Definitions

Sections 171.1 through 171.5. The general provisions in Part 171 would remain essentially unchanged. Paragraph (e) of § 171.3 would be deleted and the existing provision, which allows the use of open-head drums for hazardous waste liquids containing solids or semi-solids, would be relocated to § 173.12. Sections 171.1, 171.2, 171.4 and 171.5 would not be changed.

Section 171.7. Section 171.7 would be revised to present material incorporated by reference in an easy-to-use format, to consolidate all references in one section and to update the material to reflect changes proposed in this notice. The proposed format is identical to that used by the **Federal Register** in the "FINDING AIDS" portions of the CFR. RSPA believes this format is much easier to use than the existing format in § 171.7. The proposed *Table of Material Incorporated by Reference* provides citations of the applicable 49 CFR sections in which material is referenced and clearly identifies sources for reference material. The listing would include some reference materials which are not found in the "FINDING AIDS" because the materials are informational rather than regulatory and, thus, not suitable for incorporation by reference under 5 U.S.C. 552(a) and 1 CFR Part 51 (e.g., DOT's "Guidelines for Selecting Preferred Highway Routes for Large Quantity Shipments of Radioactive Materials.") For purposes of this notice, the listing in § 171.7 is presented as a demonstration. It does not necessarily represent a complete listing of all additions, revisions and deletions that would be necessary to update the section.

Section 171.8. Section 171.8 would be revised to accommodate U.N. terminology and definitions and to define other terms which are used in this proposal, such as "international transportation", "kPa", "n.o.s. entry" and "subsidiary hazard". Approximately 38 definitions would be added and 11 would be revised. Numerous cross references would be added or revised. Definitions for terms rendered obsolete by this proposal, such as "STC" and "Poison A" would be deleted.

Sections 171.10 through 171.20. Section 171.10 would be revised to point out the distinction between "bulk packaging" as defined in § 171.8 and "bulk carriage by vessel or barge" as addressed in 46 CFR, Subchapters D, I, O and N. Section 171.12a would be revised editorially to reflect changes in terminology and a new paragraph (g) would be added containing requirements, currently found in Part 179, applicable to couplers on Canadian tank cars. Section 171.14 would be removed and the provision for continued use of packagings marked "ICC" would be relocated to proposed § 173.23(b). No changes are proposed to §§ 171.1, 171.2, 171.4, 171.5, 171.9, 171.13, and 171.15 through 171.20.

B. Part 172; Hazardous Materials Table, Special Provisions and Hazardous Materials Communication Regulations

1. Subpart A of Part 172; General

Subpart A of Part 172 would not be changed.

2. Subpart B; § 172.101, Consolidated Hazardous Materials Table

The present HMR contain two tables that list hazardous materials: the Hazardous Materials Table ("§ 172.101 Table; or, "Table") in § 172.101 and the Optional Table in § 172.102. The § 172.101 Table is used to describe materials in domestic transportation by surface or air. The Optional Table may be used to describe a material being shipped internationally or domestically provided at least one leg of the journey is by vessel. A third table, the IM Tank Table, does not appear in the HMR but is implemented through the provisions of §§ 173.32c and 173.32d. It is used to specify conditions and limitations for the transport of hazardous materials in intermodal (IM) portable tanks. In addition to these three tables, the HMR allow two other tables to be used. One, implemented through the provisions of § 171.11, is found in the International Civil Aviation Organization's Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO Technical Instructions). It may be used both internationally and domestically for transportation by aircraft and associated transportation by motor vehicle. The second, implemented through the provisions of § 171.12a, is in the Canadian Transport of Dangerous Goods Regulations (TDG Regulations) and may be used for import shipments from Canada.

Shipping names in the Optional Table, the ICAO Technical Instructions, the TDG Regulations and the IM Tank Table derive from the listing of materials in the U.N. Recommendations. Many of the shipping names in the § 172.101 Table also derive from the U.N. Recommendations. However, a substantial number of them do not. A major objective of RSPA in this rulemaking is a consolidation of the existing tables of the HMR. This consolidation would greatly simplify use of the HMR, would reduce the volume of the HMR, and is necessary to facilitate alignment with the U.N. Recommendations with regard to harmonizing shipping names and hazard classes for materials. Also, in making the transition to performance-oriented packaging standards, it would be necessary to revise the § 172.101 Table to accommodate packing group assignments and to revise packaging authorizations. Therefore, a new § 172.101 Table is being proposed. The proposed Table is a consolidation of the existing tables and contains approximately 3000 entries. It is derived from the existing §§ 172.101 and 172.102 Tables and from the ICAO Technical Instructions. For purposes of this notice, the proposed Table lists only shipping name, hazard class and identification number for each entry in the explosives hazard class (Class 1). Provisions for explosives are to be revised as part of a separate rulemaking project. For other than explosives, complete columnar entries are given, as discussed in the following paragraphs.

Column 1 of the proposed Table, entitled *Symbols*, retains the features of existing Column 1. To the existing symbols, "+", "A", "W" and "E", whose meanings would not be changed, two additional symbols, "D" and "I", would be added.

The letter "D" is an indicator that the shipping description is inappropriate when transportation of the material is for import from or export to a country other than Canada. The letter "D" is intended to alert the shipper that another proper shipping name may have to be selected for international transportation or the material may not be regulated as a hazardous material outside the U.S. and Canada. Most descriptions preceded by the letter "D" are hazardous substances which are not specifically listed in international regulations, but are regulated internationally under different proper shipping names. Others, in the ORM-E hazard class, may not be regulated under international regulations. To facilitate the through-shipment of the former materials, proposed paragraph (c)(14) would permit use of the internationally recognized shipping description in place of the more specific technical name. However, as the material may be a hazardous substance, the package markings and shipping paper descriptions may require identification of the technical constituent for these materials.

The letter "I" is an indicator that the shipping description is not acceptable for purely domestic transportation, but may be used for shipments of materials which originate or terminate at a point outside the U.S. For the most part, these descriptions are vague or unnecessary, or describe materials that present such a minimal risk that they may not meet the DOT definition of a hazardous material. Most of these descriptions were removed from the HMR (48 FR 52306, November 17, 1983), and RSPA is actively seeking to have those descriptions also removed from international standards.

Column 2, entitled *Hazardous Materials Descriptions and Proper Shipping Names*, would list the hazardous materials entries which have been consolidated from the aforementioned tables and integrated into the proposed Table. Provisions of existing Column 2 for selecting appropriate shipping names would be retained. Shipping names, for the most part, would be aligned with the U.N. Recommendations. In general, where an existing DOT shipping name is deleted in favor of an entry from the U.N. Recommendations, a cross reference from the old name to the new name would be included.

Column 3, entitled *Hazard Class*, would specify the hazard class or division for each proper shipping name, or the word "Forbidden" to indicate that a material may not be offered for transportation or transported. In general, the class or division numbers for each material are identical to those in the U.N. Recommendations, (e.g., Class 3, Division 6.1). Exceptions involve Class 2, for which gases would be divided into three divisions: Division 2.1 (flammable gases), Division 2.2 (non-flammable gases) and Division 2.3 (toxic gases). These divisions do not appear in the U.N. Recommendations. Also, it is proposed to retain the existing hazard classes of ORM-D (for consumer commodities and small arms ammunition) and ORM-E (for hazardous substances and hazardous wastes). Discussion of each of the proposed numerical hazard classes appears elsewhere in this notice.

Column 4, entitled *Identification Number*, would list the four digit identification number assigned to each proper shipping name, preceded by the letters "UN" or "NA". Those preceded by "UN" are listed in the U.N. Recommendations, and those preceded by "NA" are peculiar to domestic transportation.

Column 5, entitled *Packing Group*, would list the packing group assignment for each listed material except for explosives (Class 1), radioactive materials (Class 7) and non-toxic gases (Divisions 2.1 and 2.2). The packing group system is designed to identify the relative hazard of each material within a hazard class and then require a packaging performance standard appropriate to the risk. In most cases a material would be assigned to only one packing group. The assignment usually would be based on RSPA's knowledge of the material in its technical grade, and an understanding that the material,

as prepared for shipment, is rarely reduced to a state which would take it outside the limits for the specified packing group. In other cases, there are specified criteria, in Subpart D of Part 173, which identify the proper packing group and the user must make a determination of the appropriate packing group based on these criteria.

Column 6, entitled *Labels*, would specify the hazard warning label or labels required for non-bulk packagings filled with the listed hazardous materials. Proposed changes to labeling requirements, based on alignment with the U.N. Recommendations, are discussed elsewhere in this notice. Where a hazardous material is known to pose multiple hazards, Column 6 would list the label corresponding to the primary hazard (i.e., the specified hazard class) followed by labels corresponding to any subsidiary hazards.

In Column 7, entitled *Special Provisions*, there is proposed a series of codes for special provisions which grant exceptions from the regulations (in addition to those specified in Column 8a) or impose additional packaging requirements. The meaning and requirements for each special provision would be set forth in § 172.102. A code consisting of numbers only would apply to bulk and non-bulk packagings and to each mode of transportation. For example, "11" states "Package as a liquid or solid, as appropriate, depending on the form of the material at 55 °C (131 °F)." A code preceded by the letter "A", "H", "R", or "W" would apply respectively only to air, highway, rail or water modes of transportation. A code preceded by the letter "B" or "N" would apply, respectively, only to bulk or nonbulk packagings. A code preceded by the letter "T" would apply to use of IM portable tanks. The absence of a special provision in association with a hazardous material description would not automatically permit that packaging arrangement. The requirements indicated are known by RSPA to be essential to the safe transportation of the referenced materials. However, other materials may also require similar consideration. For instance, a shipper may not package in a steel drum a material which is incompatible with steel just because the special provisions column fails to list "N25" (Steel single packagings are not authorized). The general requirements for all packages prescribed in proposed § 173.24 effectively prohibit such packages in transportation.

Authorizations for use of specific IM portable tanks which are currently found in the IM Tank Table would be relocated to the HMR as a series of "T" codes listed in Column 7 of the § 172.101 Table and explained in § 172.102. For additional explanation of special provisions, refer to the preamble discussion for § 172.102, which follows this discussion of the § 172.101 Table.

Column 8, entitled *Packaging Authorizations*, would specify applicable packaging sections in Part 173 for materials. Column 8a would specify section references for exceptions from packagings requirements, or "None", indicating that no packaging exceptions are provided and is similar to the existing Column 5(a). Columns 8b and 8c would specify section references for non-bulk and bulk packagings, respectively. Another proposed revision deals with the presentation of packaging sections in Part 173. Columns 8a, 8b and 8c are each headed by the term "§ 173.***" to indicate that each of the numerical data elements in those columns replaces the asterisks (*) and the completed term is a section reference. For example, the material Allyl chloride has the entries "None", "201" and "240" in Columns 8a, 8b and 8c, respectively. This indicates: (1) in Column 8a, there are no limited quantity exceptions available for this material; (2) in Column 8b, the nonbulk packaging instructions prescribed in § 173.201 shall be complied with; and (3) in Column 8c, the bulk packaging instructions prescribed in § 173.240 shall be complied with. A "None" appearing in either of these latter columns would indicate that non-bulk or bulk packaging, as applicable, is not authorized.

Column 9, entitled *Quantity Limitations*, would be similar to existing Column 6 and would specify the maximum quantities that may be offered for transportation in one package aboard passenger-carrying aircraft or railcar (Column 9a) or by cargo aircraft (Column 9b). Quantity limitations are stated in metric units and in most instances are identical to limitations found in the ICAO Technical Instructions. Application of these limits to articles and devices is clarified in the introduction to the § 172.101 Table.

Column 10, entitled *Vessel Stowage Requirements*, would specify codes for stowage requirements for specific hazardous materials, similar to the presentation in Column 7 of the existing table. Column 10c would specify "Other stowage provisions" by means of numbered notes as opposed to written text. The meaning of each note is set forth in § 176.84. These notes provide stowage information above and beyond that given in Part 176. Examples of these notes are: "Stow 'away from' corrosives," "segregation same as for oxidizers." Column 10 requirements have been aligned to correspond to those in the International Maritime Dangerous Goods (IMDG) Code. During the analysis of the present Column 7 stowage provisions, numerous discrepancies were found internally within the present table and also in the comparison between the § 172.101, and § 172.102 Tables and the present IMDG Code. Since one effort of this rulemaking will be the elimination of the § 172.102 Table, the proposed Column 10 has been redone to conform with the IMDG Code (including Amendment 22, effective July 1, 1986) thereby filling the gap for international shipments. The net result should be greater uniformity and fewer problems with improperly stowed cargo. Any amendments subsequently adopted in the IMDG Code which affect Column 10 are planned to be incorporated into the final rule.

The existing provisions in § 172.101(j) would be retained in proposed § 172.101(1). This allows a period of time to use up preprinted shipping papers and package markings when a shipping description is changed by an amendment to the table. Section 172.101(1) would also contain approval functions similar to existing provisions, to allow the Director, OHMT, to approve changes to shipping descriptions or packing authorizations which may be found to be in error or to align descriptions with changes to the IMDG Code, until such time as the § 172.101 Table could be amended through rulemaking action.

3. Subpart B; § 172.102, Special Provisions and Appendix A

It is proposed to delete the Optional Hazardous Materials Table found at § 172.102 and substitute a new section, entitled *Special provisions*, in its place. Special provisions would be a series of alphanumeric codes which would appear in Column 7 of the § 172.101 Table and which would be explained in new § 172.102. There are eight different types of codes proposed. A code consisting of numbers only would be a general provision applying to all modes of transportation and to both bulk and non-bulk packagings. For example, the § 172.101 Table entry for Sodium metal, dispersion, would specify "22" in Column 7. Referring to § 172.102, the "22" special provision would state "If the hazardous material is in dispersion in organic liquid, the organic liquid must have a flash point above 50 °C (122 °F)."

Four types of codes would be used for modal-specific requirements and consist of a letter preceding a two-digit number. The letters "A", "H", "R" and "W" would be used to precede codes applying to, respectively, the air, highway, rail and water modes of transportation. For example, the § 172.101 Table entry for Aluminum hydride would specify "A19" in Column 7. The § 172.102 reference to this special provision would state "Combination packagings consisting of outer fiber drums or plywood drums, with inner plastic packagings, are not authorized for transportation by aircraft."

Two types of codes, preceded by the letters "B" and "N", would be used for special provisions applying, respectively, to bulk and non-bulk packagings. For example, the § 172.101 Table entries for Chlorosilanes, n.o.s., would refer in Column 8c to § 173.242 for bulk packaging authorizations and to "B2", in Column 7. Referring to § 172.102, the "B2" special provision would state "MC 306 cargo tanks, DOT 57 portable tanks, and riveted tank cars are not authorized", thus limiting the packaging authorizations found in § 173.242. The § 172.101 Table entry for Ethylamine, aqueous solution, would refer in Column 8b to § 173.202 for non-bulk packagings and in Column 7 to "N15". The "N15" special provision would state "Plastic materials of construction are not authorized for any part of a packaging which is normally in contact with the hazardous material." Further explanation of bulk and non-bulk packaging provisions is found in the preamble discussion for Subparts E and F of Part 173.

One other code, preceded by the letter "T", would be used to specify authorizations for use of IM portable tanks. For example, the § 172.101 Table entry for Ethyl acetate would specify "T2" in Column 7. Referring to § 172.102, the "T2" special provision would authorize, in a manner similar to the existing IM Tank Table, use of an IM 102 portable tank. Appropriate provisions, in "T2", would address tank test pressure rating, use of bottom outlets and pressure relief device settings. For a number of reasons, RSPA has not been able to update the IM Tank Table in a timely manner. The "T" codes would be used to incorporate provisions of the IM Tank Table into the HMR and would eliminate the need for maintaining this publication separate from the HMR.

The "A", "N", and numeric special provisions and the use of a "Special Provisions" column are based, in general, on comparable provisions found in the ICAO Technical Instructions. The other types of special provisions would be implemented to accommodate modal-specific requirements and to specify IM portable tank authorizations. Through the use of special provisions, it would be possible to eliminate the repetitious language that appears throughout Part 173 of the existing regulations and to reduce the volume of the HMR.

Appendix A to Subpart B of Part 172 would be revised to provide a cross reference of identification numbers and proper shipping names. This appendix was not available at the time of publication, and therefore, has not been included in the regulatory text portion of this notice.

4. Subpart C, Shipping Papers

The shipping paper requirements of Subpart C of Part 172 would be changed to incorporate features found in the U.N. Recommendations. The use of class or division numbers would replace the words used to describe the present hazard classes (e.g., "8" in place of "Corrosive Material" or "6.1" in place of "Poison B"). Packing group numbers would be added to the basic description after the identification number (e.g. "PG II"), to indicate the level of packaging integrity required. When an "n.o.s." entry is used, the constituent or constituents which make the material hazardous must be added to the description. The present HMR require that hazardous constituents be identified only in the descriptions of poisons and hazardous substances. The U.N. system and this proposal extend this practice to all hazard classes. It is possible under the present HMR to describe a shipment of Corrosive liquid, n.o.s., without identifying the technical constituents or indicating whether the material is acidic or basic. The proposal allows the use of hazard class words (e.g. "Flammable liquid") to be used in addition to the required U.N. class (e.g., "3") or division numbers for shippers who wish to show both. The requirement to identify "Poison-Inhalation Hazard" materials is extended to nonbulk packagings having primary receptacles of one liter (1.06 quarts) or less and to Division 2.3 gases. Editorial changes include deletion of references to the § 172.102 Table and to the ORM-A, B and C hazard classes.

5. Subpart D, Marking

Sections 172.301 and 172.302. Package marking requirements found in Subpart D of Part 172 would be changed to reflect the features of the U.N. Recommendations. Section 172.301 would contain general marking requirements for non-bulk packagings and § 172.302 would contain general marking requirements for bulk packagings. A requirement to mark exemption numbers on packagings used under the terms of exemptions would be relocated from Part 107 to §§ 172.301 and 172.302, for non-bulk and bulk packagings, respectively. As in the case of shipping papers, when an "n.o.s." proper shipping name is selected to describe a hazardous material, the technical name of the hazardous constituent or constituents (up to two) would be required, as a package marking on those packagings for which marking of shipping names is required. In § 172.302, minimum size requirements for markings on bulk packagings would be added, to include minimum height requirements of 100mm (3.94 inches) on rail cars, 75mm (2.95 inches) on cargo tanks and 50mm (1.97) inches on other bulk packagings.

Section 172.303. A new § 172.303 would be added containing a prohibition against offering or transporting a package marked with a proper shipping name or identification number unless the package actually contains the identified material. An exception would permit the transport of such packages, under certain conditions, when markings are not visible in transportation. These provisions parallel existing provisions in § 173.29(d).

Section 172.312. This section would be revised for clarity and to require arrows for orientation markings, instead of "THIS SIDE UP" or "THIS END UP". These text statements cause confusion, such as when "THIS SIDE UP" appears on an end or "THIS END UP" appears on a side.

Section 172.313. A new § 172.313, entitled "Poisonous hazardous materials;", would be added to Subpart D. The requirement for permanently marking "POISON" on plastic packagings used for poisonous materials would be relocated to this new section from § 173.24. The requirement for marking "Inhalation Hazard" on packages containing inhalation toxic materials would be relocated from § 172.301 and would be made applicable to both non-bulk and bulk packagings.

Section 172.332. In § 172.332, a provision would be added, at subparagraph (c)(3), to prohibit the display of identification numbers on placards corresponding to the subsidiary, rather than the primary, hazard of a material. This is believed necessary to avoid confusion that might result fom the display of identification numbers on subsidiary placards.

Other sections in Subpart D. Sections 172.306, 172.308, 172.312, 172.316, 172.324, and 172.334 would be revised editorially

to delete references to § 172.102 and to ORM–A, B, and C and for clarity. Section 172.334 would be revised to permit display of identification numbers on POSION GAS placards. In §§ 172.326, 172.328 and 172.330, many of the existing provisions would be consolidated and relocated to § 172.302. Remaining provisions in these sections would be revised editorially.

6. Subpart E; Labeling

Package labeling requirements found in Subpart E of Part 172 would be changed to reflect the features of the U.N. Recommendations. Numerous editorial and format changes would be made for clarity and ease of use. Label graphics would be revised to permit display of hazard class or division numbers in the lower corners of square-on-point labels. Size requirements on labels would be changed slightly with regard to overall label size and inner border size to accommodate labels conforming to the U.N. Recommendations without rendering obsolete many labels which conform to existing HMR requirements. Use of text on labels for Classes 2, 3, 4, 5, 6 and 8 would be optional. The EXPLOSIVE A, B and C and BLASTING AGENT, OXYGEN and IRRITANT labels would be removed. EXPLOSIVE 1.1, 1.2, 1.3, 1.4 and 1.5 and KEEP AWAY FROM FOOD and INFECTIOUS SUBSTANCE labels would be added. Specific changes are discussed in the following paragraphs.

Section 172.400. Section 172.400 would be revised in its entirety. Proposed paragraph (a) would set forth the types of packaging to which labeling requirements apply, i.e., non-bulk packagings, DOT–106 and 110 multi-unit tank car tanks, portable tanks of less than 1000 gallons capacity, and overpacks, freight containers and unit load devices of no greater than 640 cubic feet (18.1 cubic meters) capacity which contain labeled packages. Proposed paragraph (b) would set forth in tabular form, the labels corresponding to each hazard class and the applicable sections containing label designs.

Section 172.400a. A new § 172.400a would set forth exceptions from labeling requirements which would remain essentially unchanged.

Section 172.401. In § 172.401, paragraph (d) would be removed as unnecessary, because once the shipping name and hazard class are tentatively assigned for a material under the provisions of proposed § 172.101(c)(11), the appropriate label is set forth in the § 172.101 Table.

Section 172.402. Additional labeling requirements in § 172.402 would be revised to reflect numerical hazard class nomenclature. Existing paragraphs (c) through (i) of § 172.401 are believed unnecessary and would be removed.

Sections 172.403 and 172.404. Sections 172.403 and 172.404 would not be changed.

Section 172.405. Section 172.405 would be revised to make optional the display of hazard warning text (i.e., "POISON", "FLAMMABLE LIQUID", etc.) on labels for Classes 2, 3, 4, 5, 6 and 8. The appropriate hazard class or division number would have to be displayed on labels representing the primary hazard class of the materials. Class or division numbers would not be required on subsidiary hazard labels for the aforementioned classes. Existing provisions in § 172.405, for display of "OXYGEN" on OXIDIZER labels and "CHLORINE" on POISON labels, would be eliminated.

Section 172.406. Section 172.406 would be revised for clarity.

Section 172.407. It is proposed to change the format in § 172.407, for ease of use. Several changes to label designs are proposed to accommodate labels made in conformance to existing HMR requirements and labels made in conformance with IMO, ICAO or U.N. label specifications. These changes would entail a proposed minimum label size of 100 mm (3.9 inches) instead of 4 inches and a solid line inner border of 5.0 to 6.3 mm (0.20 to 0.25 inches) from the edge of the label instead of ¼ inch. Text indicating a hazard would not have to appear exactly "as shown" in the pictorial displays (§§ 172.411 through 172.448) but, in general, would have to conform to a minimum height of 7.6 mm (0.30 inches). Minimum and maximum sizes of 6.3 mm (0.25 inches) and 12.7 mm (0.5 inches), respectively, are proposed for the height of the U.N. class or division numbers. Provisions permitting inscriptions required by the country of origin (existing § 172.407(h)) and, for import or export purposes, inscriptions on Explosives A, B and C labels, would be deleted and replaced by a provision (proposed § 172.407(f)) which would allow use of any label conforming to the U.N. Recommendations in place of the corresponding label in Subpart E of Part 172.

Section 172.411. In § 172.411, the existing EXPLOSIVE A, B, C and BLASTING AGENTS labels would be replaced with EXPLOSIVE 1.1, 1.2, 1.3, 1.4 and 1.5 labels conforming to the U.N. Recommendations. Text would be mandatory on the Explosive 1.1, 1.2 and 1.3 labels. Division numbers and compatibility group letters would also be mandatory, and minimum size requirements would be specified for them.

Sections 172.415 through 172.427. The NON-FLAMMABLE GAS, POISON GAS, FLAMMABLE GAS and FLAMMABLE LIQUID labels (§§ 172.415, 172.416, 172.417 and 172.419 respectively) would be changed only to show hazard class numbers in the lower corners of the square-on-point designs. In § 172.420, provision would be made to permit text to be printed over the vertical stripes (per the U.N. Recommendations) or placed in a white rectangle (per the existing HMR). The class number would be displayed in the lower corner of the label. The DANGEROUS WHEN WET, OXIDIZER, ORGANIC PEROXIDE and POISON labels (§§ 172.423, 172.426, and 172.427, respectively) would be changed only to show hazard class or division numbers in the lower corners.

Sections 172.431 and 172.432. A new § 172.431 would be added to specify the design and color of the KEEP AWAY FROM FOOD label, also known as the St. Andrew's Cross label. In § 172.432, both existing IRRITANT labels would be removed. A new § 172.432 would accommodate the INFECTIOUS SUBSTANCE label from the U.N. Recommendations.

Sections 172.436, 172.438, 172.440 and 172.442. The RADIOACTIVE WHITE–I, YELLOW–II and YELLOW–III labels and the CORROSIVE label (§§ 172.436, 172.438, 172.440 and 172.442, respectively) would be changed only to show hazard class numbers in the lower corners.

Section 172.444. The ETIOLOGIC AGENT label in § 172.444 would not be changed, but paragraphs (b) and (c) of this section would be removed to delete obsolete provisions.

Section 172.448. The CARGO AIRCRAFT ONLY label (§ 172.448) would not be changed. Paragraphs (b) and (c) would be removed.

7. Subpart F; Placarding

The changes proposed to placarding requirements are similar to those proposed for labeling. Editorial and format changes would be made throughout the subpart for clarity and ease of use. Placard graphics would be revised to display hazard class or division numbers on placards. Use of text (e.g., "POISON GAS", "FLAMMABLE") on placards for classes 2, 3, 4, 5, 6 and 8 would be optional. Minor changes would be made to accommodate placards conforming to the U.N. Recommendations without rendering obsolete many placards which conform to existing HMR requirements.

For those existing placards which would be rendered obsolete, a "grandfather" clause would provide for their continued use until December 31, 1992.

U.N. placards, other than RADIOACTIVE, are essentially labels enlarged from 100 millimeters to 250 millimeters on edge. Symbols generally take up the upper half of the placard, with the lower half reserved for class or division numbers, hazard warning text and four-digit identification numbers. Placards in existing Subpart F of Part 172 measure 10 and ¾ inches (273 millimeters) on edge and have symbols in the upper third of the placard, with the middle third reserved for hazard warning text or four-digit, 3 and ½-inch (89 mm) high, identification numbers and the bottom third either left blank or used to display a 1 and ¾-inch (44.45mm) high hazard class number. In this notice, it is proposed to use existing size and graphics on placards, to accommodate 3 and ½-inch identification numbers. Use of graphics on placards sized in accordance with the U.N. Recommendations would necessitate a reduction in the size of identification numbers to approximately a 2-inch (50.8 mm) height, with potential for rendering the identification numbers more difficult to read in emergency situations.

Specific changes are discussed in the following paragraphs.

Section 172.500. Section 172.500 would be revised to delete references to etiologic agents and to ORM–A, B and C materials and to clarify that placarding provisions do not apply to combustible liquids in non-bulk packagings, to Class 9 materials or to materials packaged under the "small quantity" provisions of § 173.4.

Section 172.502. Section 172.502 would be revised for clarity. A new paragraph (e) would clarify that placarding is permitted, even when not required, if the placards are appropriate for the materials being transported.

Sections 172.504 through 172.516. Section 172.504 would be revised editorially for ease of use and substantively to present new placarding tables based on the numerical hazard classes proposed in this notice. Section 172.505 would be revised editorially. Sections 172.506 and 172.507 would not be changed. Minor editorial changes would be made to §§ 172.508, 172.510 and 172.512. The provisions of § 172.514 would be made applicable to all bulk packagings, other than tank cars, and would be revised editorially. The introductory text of paragraph (c) of § 172.516 would be revised editorially and subparagraph (c)(7) would be added to require that a placard either be affixed to a background of contrasting color or have an outer border which contrasts with the background color.

Section 172.519. It is proposed to change the format in § 172.519 for ease of use. Instead of specifying the exact sizes for graphic symbols, as is done in Appendix B to Part 172, it is proposed that symbols be "as shown" in §§ 172.521 through 172.558, as is done in Subpart E with respect to labels. Also, rather than specifying 17 different heights for letters as is done at present, minimum heights of 45.0 mm (1.77 inches) for printing (with certain exceptions) and 41.0 mm (1.62 inches) for hazard class numbers would be specified. Hazard warning text on placards for Classes 2, 3, 4, 5, 6 and 8 would be made optional. The hazard class or division number would be required on a placard representing the primary hazard of a material and prohibited on subsidiary placards to aid in identifying the primary hazard of materials with multiple hazards. Except on the CORROSIVE and RADIOACTIVE placards, the placard color would be permitted to extend to the outer edge rather than only to the inner border, as an optional means of conforming to placard color specifications in the U.N. Recommendations. A "grandfather" provision would be added to § 172.519 to permit use until December 31, 1992, of existing placards (e.g., the OXYGEN placard) which may be rendered obsolete. Exceptions to the placard specifications would be provided for placards conforming to the U.N. Recommendations or the Canadian Transport of Dangerous Goods Recommendations to accommodate any minor differences in the placarding systems.

Sections 172.522 through 172.558. In §§ 172.522 through 172.558 the specifications for placards would be revised to reflect the proposed placarding provisions. Placards deleted would include EXPLOSIVES A (§ 172.522), EXPLOSIVES B (§ 172.523), BLASTING AGENTS (§ 172.524), OXYGEN (§ 172.530), CHLORINE (§ 172.536) and FLAMMABLE SOLID W (§ 172.548). Placards added would include EXPLOSIVES 1.1, 1.2 and 1.3 [§ 172.522), EXPLOSIVES 1.4 (§ 172.523), EXPLOSIVES 1.5 (§ 172.524), SPONTANEOUSLY COMBUSTIBLE (§ 172.547), DANGEROUS WHEN WET (§ 172.548) and KEEP AWAY FROM FOOD (§ 172.553).

Hazard class numbers (or in the case of Division 5.1 and 5.2, division numbers) would appear on all except the DANGEROUS placard in numbers proportionately sized to a height of 1 and ¾ inches on full-sized placards. For other than the CORROSIVE and RADIOACTIVE placards, placard colors would be depicted as running to the outer edges in conformance with the U.N. Recommendations. The DANGEROUS (§ 172.521) and RESIDUE (§ 172.525) placards and the square white background in § 172.527 would not be changed.

Specific changes are discussed in the following paragraphs.

Section 172.500. Section 172.500 would be revised to delete references to etiologic agents and to ORM–A, B and C materials and to clarify that placarding provisions do not apply to combustible liquids in non-bulk packagings, to Class 9 materials or to materials packaged under the "small quantity" provisions of § 173.4.

Section 172.502. Section 172.502 would be revised for clarity. A new paragraph (e) would clarify that placarding is permitted, even when not required, if the placards are appropriate for the materials being transported.

Sections 172.504 through 172.516. Section 172.504 would be revised editorially for ease of use and substantively to present new placarding tables based on the numerical hazard classes proposed in this notice. Section 172.505 would be revised editorially. Sections 172.506 and 172.507 would not be changed. Minor editorial changes would be made to §§ 172.508, 172.510 and 172.512. The provisions of § 172.514 would be made applicable to all bulk packagings, other than tank cars, and would be revised editorially. The introductory text of paragraph (c) of § 172.516 would be revised editorially and subparagraph (c)(7) would be added to require that a placard either be affixed to a background of contrasting color or have an outer border which contrasts with the background color.

Section 172.519. It is proposed to change the format in § 172.519 for ease of use. Instead of specifying the exact sizes for graphic symbols, as is done in Appendix B to Part 172, it is proposed that symbols be "as shown" in §§ 172.521 through 172.558, as is done in Subpart E with respect to labels. Also, rather than specifying 17 different heights for letters as is done at present, minimum heights of 45.0 mm (1.77 inches) for printing (with certain exceptions) and 41.0 mm (1.62 inches) for hazard class numbers would be specified. Hazard warning text on placards for Classes 2, 3, 4, 5, 6 and 8 would be made optional. The hazard class or division number would be required on a placard representing the primary hazard of a material and

prohibited on subsidiary placards to aid in identifying the primary hazard of materials with multiple hazards. Except on the CORROSIVE and RADIOACTIVE placards, the placard color would be permitted to extend to the outer edge rather than only to the inner border, as an optional means of conforming to placard color specifications in the U.N. Recommendations. A "grandfather" provision would be added to § 172.519 to permit use until December 31, 1992, of existing placards (e.g., the OXYGEN placard) which may be rendered obsolete. Exceptions to the placard specifications would be provided for placards conforming to the U.N. Recommendations or the Canadian Transport of Dangerous Goods Recommendations to accommodate any minor differences in the placarding systems.

Sections 172.522 through 172.558. In §§ 172.522 through 172.558 the specifications for placards would be revised to reflect the proposed placarding provisions. Placards deleted would include EXPLOSIVES A (§ 172.522), EXPLOSIVES B (§ 172.523), BLASTING AGENTS (§ 172.524), OXYGEN (§ 172.530), CHLORINE (§ 172.536) and FLAMMABLE SOLID W (§ 172.548). Placards added would include EXPLOSIVES 1.1, 1.2 and 1.3 (§ 172.522), EXPLOSIVES 1.4 (§ 172.523), EXPLOSIVES 1.5 (§ 172.524), SPONTANEOUSLY COMBUSTIBLE (§ 172.547), DANGEROUS WHEN WET (§ 172.548) and KEEP AWAY FROM FOOD (§ 172.553).

Hazard class numbers (or in the case of Division 5.1 and 5.2, division numbers) would appear on all except the DANGEROUS placard in numbers proportionately sized to a height of 1 and ¾ inches on full-sized placards. For other than the CORROSIVE and RADIOACTIVE placards, placard colors would be depicted as running to the outer edges in conformance with the U.N. Recommendations. The DANGEROUS (§ 172.521) and RESIDUE (§ 172.525) placards and the square white background in § 172.527 would not be changed.

8. Appendices to Part 172.

Appendix A to Part 172, containing color tolerance charts and tables, would not be changed. Appendix B, containing dimensional specifications for placard designs, would be removed. Appendix C, containing recommended dimensions for placard holders, would not be changed.

C. Part 173; Shippers, General Requirements for Shipments and Packagings

1. Subpart A of Part 173, General

Section 173.1. In § 173.1, a paragraph would be added to indicate that, although the provisions in Subchapter C of 49 CFR generally are based on the U.N. Recommendations and are consistent with the regulations of ICAO and IMO, they are not identical in all respects and compliance with the HMR will not guarantee compliance with international regulations.

Section 173.2. Section 173.2 would be revised to list the various hazard classes, by class or division number and name, and to provide an index to the hazard class definitions which appear throughout Part 173.

Section 173.2a. Proposed § 173.2a would replace existing § 173.2 and provide requirements for classification of hazardous materials with multiple hazards. A precedence of hazard table, which is based on the U.N. Recommendations, would be used to classify those materials posing multiple hazards involving Classes 3, 4.1, 4.2, 4.3, 5.1, 6.1, and 8. For other hazards, a precedence of hazard ranking, similar to that in existing § 173.2, would be used to determine the appropriate hazard class. Under these proposed criteria, materials which are toxic by inhalation receive emphasis, in keeping with concerns expressed during the rulemaking process under Docket HM–196.

Section 173.3. Changes proposed to § 173.3 include an editorial revision of paragraph (a) and (b). Also, in paragraph (c) provisions for use of salvage drums are revised to permit use of plastic drums and to require that salvage drums conform to U.N. standards 1A2, 1B2, 1N2 or 1H2.

Section 173.3a. This section would be revised to address new packaging provisions for liquids which are toxic by inhalation.

Sections 173.4 and 173.5. These sections would be revised to conform to U.N. terminology (e.g., "Class 3" instead of "flammable liquid") and to include measurements in both U.S. standard and international units. In § 173.4, quantity limits for Division 6.1 (poisonous liquids), Packing Groups II and III, would be set at 30 milliliters for liquids and 30 grams for solids, and for Packing Group I poisons, 1 gram for both liquids or solids.

Section 173.6 through 173.11. Section 173.6 would be removed and requirements applicable to air shipments would be consolidated in proposed § 173.27. Sections 173.7, 173.9 and 173.10 would be revised editorially. No changes are proposed to § 173.11.

Section 173.12. This section would be revised to consolidate provisions applicable to the packaging of hazardous wastes. Provisions in existing § 171.3 applying to use of open head drums and in § 173.28 applying to reuse of packagings for waste materials would be relocated to § 173.12 and the section would be revised editorially.

2. Subpart B; Preparation of Hazardous Materials for Transportation

Section 173.21. Section 173.21 would be rewritten to improve its clarity. The categories of materials which are forbidden would be expanded to include electrical devices which are likely to create sparks or generate a dangerous quantity of heat, unless the devices are packaged in a manner which precludes such an occurrence. Also forbidden would be the packing of any incompatible material (hazardous or non-hazardous) in the same packaging, freight container, or overpack if the mixing of these materials would be likely to cause a dangerous evolution of heat, flammable or poisonous gases or vapors, or to produce corrosive materials. This is similar to an existing provision in § 173.21(a) which addresses the mixing of two hazardous materials.

Sections 173.22 and 173.22a. No changes are proposed to §§ 173.22 and 173.22a.

Section 173.23. The provision for continued use of packagings marked "ICC" would be relocated from § 171.14 to proposed § 173.23(a). Obsolete provisions in existing § 173.23(a) concerning DOT–34 drums would be removed.

Section 173.24. The standard requirements for all packages which appear in existing § 173.24 would be substantively revised and expanded into three sections. Proposed § 173.24 would address general requirements applicable to all packages. Proposed § 173.24a would address general requirements unique to non-bulk packages and proposed § 173.24b would address those requirements unique to bulk packages. A statement of applicability would be added to § 173.24 to make it clear that the section applies to all packagings used for hazardous materials: specification and non-specification, bulk and non-bulk, and new and reused packagings. General marking requirements for specification packages would be relocated from existing § 173.24 to § 178.0–3. Some requirements applying to workmanship and construction materials would be removed; others would be relocated to

the individual specifications in Part 178. Language in proposed § 173.24 would address what constitutes an "authorized packaging". Compatibility requirements would be restated for clarity, and general provisions applicable to the use of vents on packagings are proposed. A requirement would be included that liquids must not completely fill a receptacle at a temperature of 55 °C. (131 °F.) or less.

Section 173.24a. Proposed § 173.24a contains additional general requirements applicable to non-bulk packagings. Requirements applying to closures, securing and cushioning, use of nails, etc. are essentially a restatement of existing provisions and appear in paragraph (a). Also contained in this paragraph is a requirement that each non-bulk package must be capable of withstanding a vibration test. The absence of a vibration standard was a criticism of the U.N. system that was mentioned in numerous comments to the ANPRM. The test would appear in Appendix C to Part 173. Non-bulk filling limits, based on the U.N. Recommendations, are proposed. Also, requirements applicable to packing different hazardous materials in the same outer packaging are proposed.

Section 173.24b. In proposed § 173.24b, filling limits are standardized for all bulk packagings. A requirement has been added that non-reclosing pressure relief devices not be used for materials that are flammable or poisonous, or both. Several of the special provisions for packaging materials which are toxic by inhalation require stainless steel cargo tanks and portable tanks to be used, but also permit the use of other steels if they are of an "equivalent thickness", as determined from the formula presented in § 173.24b. See the preamble to Subpart F of Part 173 for additional discussion concerning filling limits and equivalent steels.

Section 173.25. In § 173.25, the provisions for overpacks would be revised to require the use of orientation arrows in place of the "This side up" or "This end up" marking, consistent with proposed § 172.312. Also, it is proposed to prohibit the overpacking of Packing Group I corrosives and oxidizers with other materials and to delete existing prohibitions against overpacking nitric acid, perchloric acid, and similar materials.

Section 173.26. Proposed § 173.26 would address quantity limitations on packagings. Existing provisions for metric conversions would be eliminated.

Section 173.27. Proposed § 173.27 would contain standard packaging requirements for transportation by aircraft. Pressure requirements and requirements for use of absorbent materials for packagings used for liquids, based on the ICAO Technical Instructions, are proposed. It is proposed that Packing Group III materials conform to Packing Group II performance requirements for transportation by aircraft. For combination packagings, quantity limitations for inner packagings would appear in two tables, one for passenger aircraft and the other for cargo aircraft only, primarily based on the ICAO Technical Instructions and on the maximum quantity per package authorized in the § 172.101 Table.

Section 173.28. Many of the present DOT specification packagings are marked "NRC" (non-reuseable container) or "STC" (single trip container) and may only be used one time for hazardous materials service. Existing § 173.28 contains the restrictions on reuse of packagings. It is proposed to remove many of these restrictions and generally align requirements with the U.N. Recommendations. Proposed § 173.28 allows the reuse of packagings for hazardous materials service if the packaging is free from corrosion or other damage, is leakproofness tested, and, in the case of a metal or plastic drum or jerrican, the packaging meets certain thickness requirements. Packagings made of paper, textiles, fiberboard and plastic film would not be authorized for reuse for hazardous materials. This proposal differs from existing provisions in that all packagings used for liquids would have to be leak tested. Only DOT–17 series drums are retested, or "reconditioned", at present. In addition, proposed § 173.28 defines the terms "reconditioning" and "remanufacture." Reconditioning is defined because even though the U.N. Recommendations do not specify reconditioning before reuse, they do acknowledge the practice and provide special markings for reconditioned packagings which would be adopted in this rulemaking. Remanufacturers would be made subject to the HMR to the same extent as manufacturers of new packagings.

Section 173.29. This section would be revised editorially for clarity.

Section 173.30. This section would not be changed.

Section 173.31. Paragraph (a) of this section would be revised to remove effective dates which have already passed, to relocate certain requirements currently in Part 179, and to enhance requirements applicable to the filling of tank cars and use of pressure relief devices. It would be prohibited to load a material into a tank car if the temperature of the material exceeded the tank's design temperature range. Provisions would be added to relate tank pressure ratings and the associated opening pressures of pressure relief devices to lading pressure at the maximum lading temperatures likely to be reached under normal transportation conditions. (See the preamble to Subpart F of Part 173 for additional discussion concerning proposals related to bulk packagings.) Use of air pressure for the loading or unloading of flammable materials would be restricted as would the use of non-reclosing pressure relief devices on tank car tanks used for Class 3, 4, or 6.1 liquids.

Section 173.32. Equivalency provisions would be added to permit the use of DOT 51 portable tanks where DOT 56, 57, or 60 tanks are authorized, and use of DOT 60 portable tanks where DOT 56 or 57 tanks are authorized. As for tank cars, restrictions would be imposed on lading density and temperature with respect to the lading density and temperature of the tank, on the use of air pressure for loading or unloading flammable materials and on the use of non-reclosing pressure relief devices on tanks used for Class 3, 4, or 6.1 liquids. Tank minimum design pressure requirements, based on lading pressures, would be prescribed. For DOT 60 and marine portable tanks used for multiple hazard liquids, a minimum tank design pressure of 25 p.s.i. is proposed.

Section 173.32c. This section would be editorially revised to implement inclusion of the IM Tank Table in § 172.102.

Section 173.32d. This section would no longer be needed and would be removed.

Section 173.33. Consistent with proposals made under Docket HM–183, it is proposed to amend the general use provisions for cargo tanks to address lading density and temperature, tank design pressure based on lading pressures, use of non-reclosing pressure relief devices and use of air pressure for loading or unloading. Equivalency provisions would be added to permit an MC 331 to be used where an MC 306, 307 or 312 cargo tank is authorized and to permit use of an MC 307 or 312 where an MC 306 is authorized. Also, a minimum design pressure of 25 p.s.i. (172.4 kPa) would be required for MC 307 and 312 cargo tanks used for multiple hazard liquids.

Section 173.40. This section would be added to implement general packagings requirements for use of cylinders for materials which are toxic by inhalation. The requirements are similar to those

applicable to Poison A liquids and gases in present § 173.327.

3. Subpart C; Explosives and Blasting Agents

Subpart C, containing the hazard class definitions and packagings requirements for explosives (i.e., Classes A, B and C explosives and blasting agents), has not been revised in this proposal. Proposals, to align DOT's requirements applicable to explosives with those in the U.N. Recommendations, will be published in a separate rulemaking action at a future date.

4. Subpart D; Hazard Class Definitions

In the present regulations a single hazard class or, in some instances, several classes of similar materials are placed in a single subpart of Part 173, from Subpart D (flammable, combustible and pyrophoric liquids) to Subpart O (ORM–E). Each subpart contains the hazard class definitions, general requirements applicable to specific classes of materials, exceptions, and packaging requirements for both "n.o.s" materials and specifically named materials or articles within the class or classes. In this proposal, this information is organized quite differently. Subpart D would contain definitions, packing group assignments and exceptions for all of the hazard classes, excluding explosives and radioactive materials. For the most part, hazard class definitions are based on the U.N. Recommendations. Subpart E would contain non-bulk packaging sections and Subpart F would contain bulk packaging sections for materials other than Classes 1 and 7.

Section 173.115. Danger from gases can arise from a number of characteristics, which in turn depend on the physical or chemical nature of the gas. One danger is flammability and is possessed by those gases which burn, such as methane, propane, hydrogen, etc. A second danger arises from the energy possessed by the gas in a compressed state. This danger depends on the gas being compressed and the gas under pressure may be in the liquid or gaseous form. Compressed air and dichlorodifluoromethane (Refrigerent 12) are examples of gases presenting only this danger. A third danger is that of toxicity and is possessed by poisonous gases. Phosgene is an example of a gas with this characteristic. A particular gas may exhibit more than one of these dangers. A forth danger is support of combustion by a gas which is not of itself flammable. Oxygen is an example of a gas with this hazard. Compressed carbon monoxide would be an example of a gas which is flammable, toxic and, depending on its pressure level, dangerous by compression as well.

The hazard class definitions for Class 2 (gases) in this proposal are not identical to the definitions contained in the U.N. Recommendations for that class. The U.N. classing procedures for gases (Class 2) do not distinguish between the three aforementioned sources of danger and, for that reason, RSPA considers the U.N. Recommendations to be deficient for this hazard class. It is proposed to divide Class 2 into three divisions as follows: Division 2.1 is for flammable gases, Division 2.2 is for compressed gases (non-flammable, non-toxic) and Divison 2.3 is for toxic (poisonous) gases. While this is a departure from the U.N. Recommendations, it is consistent with the IMDG Code of IMO which subdivides Class 2 into these same divisions for storage and segregation purposes (see 5.1.2 of the IMDG Code). In addition, Division 2.3 is assigned packing groups. Divisions 2.1 and 2.2 are not.

Division 2.1 (flammable gases) is defined in terms of the material being: (1) a gas under ambient conditions (i.e., 14.7 psia (101.4 kPa) and 68 °F (20 °C)), and (2) flammable. There are no pressure requirements. The flammability criteria, having to do with flammability limits, come from the existing regulations (§ 173.300(b)(1)), but the Bureau of Explosives Flame Projection test, a feature of the present HMR (§ 173.300(b)(2)), would be deleted.

Division 2.2 (non-flammable, compressed gas) is defined strictly in terms of the pressure that it exerts on the container. The pressure levels (40 psia (275.8 kPa) at 70 °F (21.1 °C) or 104 psia (717.1 kPa) at 130 °F (54.4 °C)) are the same as those in the existing regulations at § 173.300(a). The definition applies to both liquefied and non-liquefied compressed gases.

Division 2.3 (poisonous or toxic gas) is defined in terms of these materials being gases at ambient conditions (as in the case of Division 2.1) and by their toxicity. Toxicity is based either on known human experience, or on laboratory tests on unspecified animals. There are no pressure requirements for Division 2.3.

In addition to defining the hazard classes and divisions for gases, proposed § 173.115 defines certain other terms used in the classing of gases. These definitions of terms are similar to those presently found in the regulations at § 173.300 (c) through (i).

Section 173.116. Division 2.3 materials would be placed into packing groups for purposes of this proposal. Packing Group I (for the most dangerous materials) would be further subdivided into zones A and B with A being for the most lethal gases. So for Division 2.3, there would be four Packing Group levels: I zone A, I zone B, II, and III. The proposed levels are: Packing Group I zone A: LC50 less than or equal to 200 ppm; Packing Group I zone B: LC50 greater than 200 ppm and less than or equal to 1000 ppm; Packing Group II: LC50 greater than 1000 ppm and less than or equal to 3000 ppm; and Packing Group III: LC50 greater than 3000 ppm and less than or equal to 5000 ppm.

While there are no packing groups (or even divisions) for gases (Class 2) in the U.N. Recommendations, the levels of toxicity for Packing Groups I, II, and III for Division 2.3 in this proposal do have their origins in the U.N. system. Division 6.1 materials (poisonous materials, other than gases) are assigned packing groups based on their level of toxicity. For liquids this toxicity may be by the path of inhalation, and the criteria are the level of toxicity, given by the LC50, and the degree of volatility of the liquid. These criteria are presented in a graph found at Section 6.5 of Chapter 6 of the U.N. Recommendations, entitled "Inhalation Toxicity: Packing Group Borderlines". The volatility level in this graph is given in milliliters per cubic meter (mL/m^3) or ppm for the liquids. The right hand boundary of this graph is at the volatility value of 1,000,000 mL/m^3. This is in fact the boundary where liquids end and gases begin (i.e., the material is all in the gaseous state). The LC50 values in mL/m^3 for the packing group thresholds or border lines at this point (the right hand boundary of the graph) are the same as those for Division 2.3 in this proposal: Packing Group I, LC50 less than or equal to 1000 ppm; Packing Group II, LC50 greater than 1000 ppm and less than or equal to 3000 ppm; and Packing Group III, LC50 greater than 3000 ppm and less than or equal to 5000 ppm. In other words, the packing group criteria for Division 2.3 materials in this proposal are an extension of the criteria for inhalation toxicity for highly volatile liquids in Division 6.1 in the U.N. Recommendations. It is logical to treat toxic gases in the same fashion as toxic, volatile liquids, and that is what this notice proposes to do.

Section 173.120. Section 173.120 contains the proposed definitions for Class 3—flammable and combustible liquids. In the present regulations, flammable, combustible, and pyrophoric liquids are defined and regulated in Subpart D of Part 173 beginning at § 173.115. Flammable liquids are defined

as liquids with a flash point below 100 °F (38 °C), combustible liquids as liquids with a flash point at or above 100 °F to 200 °F (93.3 °C), and pyrophoric liquids as those which ignite spontaneously below 130 °F (54.4 °C). In the U.N. system pyrophoric liquids have their own division (4.2) within Class 4 along with other materials which are subject to spontaneous combustion, and flammable liquids (Class 3) are liquids with a flash point of 141 °F (60.5°) and below. Combustible liquids (with flash points between 141 °F (60.5 °C) and 200 °F) are not regulated.

In this proposal, pyrophoric liquids are moved to Division 4.2. Flammable liquids are defined as those with a flash point of 141 °F or lower, the same as in the U.N. Recommendations. However, RSPA proposes to continue to regulate materials with flash points between 141 °F and 200 °F as combustible liquids. A domestic shipper of a material with a flash point of 100 °F to 141 °F would have the choice of either shipping the material as a flammable liquid (as would have to be done if it were an international shipment) or could continue to classify the material as a combustible liquid and ship it with the present level of regulation applying to combustible liquids (e.g., no regulation in packagings of 110 gallons or less and, except for carriage by aircraft and vessel, shipping paper, package marking and placarding only for packagings greater than 110 gallons). For liquid material with flash points between 141 °F and 200 °F, a domestic shipper would have to ship his material as a combustible liquid, subject to the same level of regulation which presently exists for combustible liquids.

In addition, RSPA is proposing to regulate materials with flash points at or above 200 °F as combustible liquids when those materials are transported as liquids at or above their flash points. This proposal would apply to such things as asphalt which might even be solid during ambient conditions (especially in winter), but which may be transported heated. When heat is added to melt the material it may be sufficient to raise its temperature to or above the flash point. When the materials are above their flash points, they are easily ignited, and RSPA feels that at least hazard communication warnings should be carried on the transport vehicle to warn emergency responders and others at the scene of an accident of the potential danger of the lading in the tank.

Section 173.120 of the proposal also contains the definition of "flash point" presently found at § 173.115(d).

Section 173.121. Materials in Class 3 are assigned packing groups in the U.N. system based on their volatility and ignitability. Flash points and boiling points are used as the measures of these properties in assigning those packing groups. Proposed § 173.121 assigns packing groups to Class 3 materials using the criteria found in the U.N. Recommendations. Special procedures for classing and assigning packing groups to viscous liquids are also found in the U.N. Recommendations. These procedures are included in this proposal at § 173.121.

Section 173.124. In the U.N. system, Class 4 is made up of three types of materials which are placed in different divisions under that class. Division 4.1 consists of flammable solids, Division 4.2 consists of spontaneously combustible materials, including pyrophoric liquids, and Division 4.3 consists of dangerous when wet materials. In this proposal, § 173.124 contains the definitions for these materials.

In the present regulations, the flammable solid hazard class includes spontaneously combustible materials (except pyrophoric liquids which are found in Subpart D along with flammable and combustible liquids) and water-reactive materials. The definition of flammable solid is a very subjective one and contains no tests or other specific standard by which a material may be measured. The three definitions in the U.N. system for Divisions 4.1, 4.2, and 4.3 are very much the same, i.e., quite subjective.

The definitions in this proposal for Class 4 materials are a combination of the descriptions from both the U.N. Recommendations and the present HMR. Materials are generally placed in one of the three divisions in Class 4 based on experience.

In December of 1986 the U.N. Committee of Experts on the Transport of Dangerous Goods adopted tests and criteria for assignment of hazardous materials to the three divisions of Class 4. These tests and criteria have not been included in this proposal due to lack of time. However, comments are requested concerning the new U.N. criteria and their suitability for inclusion in the HMR as part of this rulemaking project. Copies of the text adopted by the committee may be obtained on request from RSPA.

Section 173.125. Class 4 materials of all three divisions are assigned packing groups. This is addressed in § 173.125 of this proposal. As in the case of the division definitions, the criteria for packing group assignment are not tests. In fact the U.N. system does not contain any criteria for packing group assignment of Class 4 materials. Packing groups are assigned to Divisions 4.1, 4.2, and 4.3 by experience, and one must consult the § 172.101 Table to obtain the packing group of a given Class 4 material. Prior to December 1986, this proposal follows the U.N. system.

Section 173.128. Section 173.128 of this proposal contains the definitions for Divisions 5.1 (oxidizers) and 5.2 (Organic peroxide) within Class 5. Like the Class 4 definition, the definition for oxidizer (Division 5.1) in both the HMR and the U.N. Recommendations is quite subjective and contains no tests or other scientific criteria. The definition in this proposal uses the language from the HMR as it seems to be more understandable (giving examples) and clearer than that in the U.N. Recommendations, but is consistent with the U.N. definition.

The definitions for Division 5.2 (organic peroxides) in both the HMR and the U.N. are more specific than those for Division 5.1 or Class 4. The definitions in the U.N. and the HMR are consistent with each other, but are not identical. For purposes of this proposal, the language from the HMR is proposed as being clearer than that of the U.N.

Section 173.129. Both Division 5.1 and Division 5.2 materials are assigned packing groups. As in the case of Class 4, this is not done based on criteria (none are given in the U.N. Recommendations), but on experience. The packing groups for Divisions 5.1 and 5.2 materials are found in column 5 of the § 172.101 Table, and § 173.129 references the § 172.101 Table for packing group assignment.

Section 173.132. Class 6 contains two divisions: Division 6.1 for poisonous (toxic materials), and Division 6.2 for infectious substances (etiologic agents). Proposed § 173.132 defines Division 6.1 materials. The U.N. system for the regulation of poisonous materials is quite different from the HMR. The present HMR have three hazard classes for poisons: Poison A's, the most dangerous class, encompass gases and volatile liquids which are classed by experience and not specific criteria; Poison B's encompass liquids and solids and have definite classing criteria for toxicity by the paths of oral ingestion, dermal contact, and inhalation ingestion; Irritating materials are a class of liquids or solids which cause extreme irritation, especially in confined spaces. The DOT class definition for irritating materials does not contain specific criteria, and these materials are simply designated, based on experience. This

class would be eliminated and irritating materials would be classed as Division 6.1 materials.

In the U.N. system, Division 6.1 materials are poisonous materials, other than gases (toxic gases are in Class 2), and the degree of danger is expressed by the packing group assignment. For each of the three packing groups, there are specific criteria, based on animal tests, for each of the three paths of exposure (oral, dermal and inhalation). This proposal adopts the U.N. definitions and accepts the U.N. criteria for exposure by the three paths. Packing groups are assigned in § 173.133, but the threshold criteria from Packing Group III are used in the Division 6.1 definition at § 173.132. In addition to the threshold levels given in the division definition, § 173.132 describes the animal tests which are used to discover the threshold toxicity levels of materials when their toxicity is not known.

Section 173.133. Section 173.133 of this proposal assigns packing groups to Division 6.1 materials based on specific toxicity criteria. In the case of inhalation toxicity, the criteria are given in the form of a graph. The graph is based on section 6.5(c) of Chapter 6 of the U.N. Recommendations. This graph was mentioned previously in the discussion of Division 2.3 toxic gases. The data presented in this graph can be extended beyond the boundary which exists between volatile liquids and gases, and this was done to obtain packing group criteria for toxic gases (see discussion on proposed § 173.115). The criteria in this graph are important because special packaging provisions are specified for liquids which fall into Packing Group I of Divison 6.1 because of inhalation toxicity.

Section 173.134. This proposed section contains the definition of the second division of Class 6, Division 6.2, infectious substances. This division is the same as the etiologic agent hazard class in the present HMR. The term "infectious substance" probably conveys a more meaningful message to most people than "etiologic agent". The definitions of these terms in the present HMR and the U.N. Recommendations are similar, with the exception that the HMR mentions the fact that in the U.S. the Department of Health and Human Services has authority to designate materials and specify packagings and labeling requirements for these materials and has promulgated rules to do this in Title 42 of the CFR.

The definition for Division 6.2 in this proposal is similar to that in the present HMR and references the requirements of HHS and their rules at Title 42 of the Code of Federal Regulations.

Section 173.136. In the U.N. Recommendations, corrosive materials are placed in Class 8. There are no divisions in Class 8, but there are three packing groups. Class 8 is comparable to the corrosive material hazard class in the present regulations, with one exception. In the HMR, a corrosive material is one which causes destruction of human skin tissue or which has a severe corrosion rate on steel. A U.N. Class 8 material is one which destroys human skin tissue, or has a severe corrosion rate on steel *or aluminum.* In the HMR, a material which corrodes aluminum is usually an ORM–B (Other Regulated Materials, category B) material.

Thus, the U.N. Class 8 definition combines the corrosive material definition (see existing § 173.240) and the ORM–B definition (see existing § 173.500) from the HMR. Under this proposal, the ORM–B hazard class would be eliminated and the U.N. definition for corrosive material would be adopted.

The present HMR references a rabbit skin test in the definition of the corrosive material hazard class to demonstrate destructiveness to human skin, and a corrosion test on steel to demonstrate corrosivity to this metal. The Class 8 definition in this proposal contains both of these tests plus a corrosion test for aluminum similar to the steel test. It should be noted that the Class 8 definition in the U.N. Recommendations does not contain any of these tests, but the criteria for packing group assignment do reference the two metal corrosion tests.

Section 173.137. Section 173.137 of this proposal contains the packing group assignments for Class 8 materials. The Packing Group I criterion specifies an animal skin test where necrosis occurs within a period of three minutes or less.

The Packing Group II criterion is a skin test with necrosis appearing in more than three minutes but not more than 60 minutes.

Packing Group III criteria for Class 8 materials contain three elements: a skin test, as in the case of Packing Group I and II materials, but with necrosis appearing in not more than four hours; or a corrosion test on steel with a rate greater than a 6.25 mm (0.246 inches) per year at a temperature of 55 °C (131 °F); or, a corrosion test on aluminum with a rate greater than 6.25 mm per year at 55 °C (131 °F). Materials which are only corrosive to metals and not to skin are assigned to Packing Group III.

Section 173.140. In the U.N. system, Class 9 is reserved for miscellaneous hazardous materials—e.g., materials which experience has shown need to be regulated but which do not fit any other hazard class definition. The hazard definition for Class 9 in this proposal includes the general wording of the U.N. Class 9 definition and, in addition, includes the definition for ORM–A's from the HMR. ORM–A's are defined in the HMR as materials with irritating or noxious effects that might cause hazardous situations in enclosed spaces, especially in aircraft. In this proposal, some ORM–A's would be regulated as Division 6.1, Packing Group III materials, but others would be regulated in Class 9. The ORM–A hazard class would disappear. Similarly, ORM–C materials, which do not meet a UN hazard class definition, would be regulated under Class 9 in this proposal. The ORM–C class would also disappear.

Section 173.144. Proposed § 173.144 defines the ORM–D and ORM–E hazard classes. These are the only ORM classes that would be retained from the present HMR. The ORM–D hazard class definition, which covers consumer commodities and small arms ammunition, would be essentially unchanged from the present HMR. Similarly, the ORM–E hazard class definition, which covers hazardous substances and hazardous wastes which do not satisfy any other hazard class definition, would be virtually unchanged from the existing HMR. These two hazard classes would be retained from the present system because the U.N. system either does not regulate them and DOT does (because of a statutory requirement or experience), or they may be regulated under the U.N. system but the level of regulation is inappropriate because of the form or quantity of the materials as shipped. In the case of ORM–E's, DOT is obligated to designate hazardous substances and hazardous wastes according to regulations issued by the Environmental Protection Agency pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA).

RSPA notes that in its December 1986 meeting, the U.N. Committee of Experts on the Transport of Dangerous Goods adopted shipping descriptions for environmentally hazardous substances (specifically, "Environmentally hazardous substances, solid, n.o.s., Class 9, UN 3077" and "Environmentally hazardous substances, liquid, n.o.s., Class 9, UN 3082"). In light of this, comments are requested concerning elimination of the ORM–E hazard class, and inclusion of hazardous substances and hazardous wastes in Class 9.

Comments are also requested concerning the elimination of the ORM–D hazard class and inclusion of ORM–D materials (i.e., consumer commodities and small arms ammunition) in Class 9.

Section 173.145. The packing groups for ORM material are found in Column 5 of the § 172.101 Table. Most are assigned to Packing Group III. Proposed § 173.145 references the § 172.101 Table for packing group assignment.

Sections 173.150 through 173.156 would contain exceptions from packaging requirements and other requirements of the regulations for Classes 3, 4.1, 5, 6.1, 8, 9, ORM–D and ORM–E. As is presently the case, exceptions are provided for a specific material only if the entry for that material in the § 172.101 Table (specifically, column 8a) contains a reference to one of the aforementioned sections for exceptions. In general, exceptions would not be provided for Packing Group I materials (excluding flammable liquids).

The proposed exceptions are based on existing provisions in the HMR, but are somewhat more restrictive. For example, for materials packaged under "limited quantity" provisions, there currently are no weight restrictions on outer packagings for many of the materials such as flammable liquids, corrosive materials and poisons. It is proposed to impose a per package limit of 30 kilograms (66.1 pounds) on most materials shipped under limited quantity provisions to minimize their aggregate risk. This parallels existing provisions for "consumer commodity" packages. Existing exceptions from rail and highway modal requirements would be removed to eliminate ambiguities concerning the applicability of incident reporting and training requirements to shipments of limited quantities transported by railroad car or motor vehicle.

Section 173.150. Proposed § 173.150 contains exceptions for flammable and combustible liquids (Class 3). Limited quantity provisions would be essentially unchanged except for the 30 kg package limitation previously mentioned. The limited quantity provision provides an exception from specification packaging requirements, labeling (except for transport by aircraft), placarding and the carrier requirements of Parts 174 and 177 (except those related to shipping papers.)

As in the HMR at present, a material which conforms to the limited quantity provisions and which meets the definition in § 171.8 for a consumer commodity, may be reclassed as an ORM–D material and renamed "Consumer commodity". The consumer commodity provision provides an exception from shipping paper requirements and certain other minor exceptions in addition to the exceptions provided for limited quantities.

Existing exceptions for alcoholic beverages and aqueous solutions of alcohol would be retained as would existing exceptions for combustible liquids. A provision would be added whereby a flammable liquid with a flash point at or above 38 °C (100 °F) may be reclassed as a combustible liquid, except for transport by aircraft or vessel.

The existing exceptions in § 173.118(b) for high flash point (73 °F or 22.8 °C) flammable liquids would be eliminated and these materials would be subject to Packing Group III packaging requirements under this proposal.

Section 173.151. This section would provide limited quantity and consumer commodity exceptions for flammable solids (Division 4.1) in Packing Groups II and III. Outer packagings would be limited to 30 kg gross weight. Inner packagings would be limited to 1 kilogram (2.2 pounds) net capacity each for Packing Group II materials and 5 kg (11.02 pounds) for Packing Group III. The relief provided would be the same as for flammable liquids (i.e., packaging, labeling, placarding, etc.)

Section 173.152. This section would provide limited quantity and consumer commodity exceptions for oxidizers (Division 5.1) and organic peroxides (Division 5.2) in Packing Groups II and III. The exceptions are generally the same as those now provided in the HMR.

Section 173.153. This section would provide limited quantity and consumer commodity exceptions for poisonous materials (Division 6.1). Limited quantity provisions would be limited to Packing Group III materials and would not include a labeling exception. Consumer commodity provisions would be provided for limited quantities and for drugs and medicines, irrespective of packing group.

Section 173.154. This section would provide limited quantity and consumer commodity exceptions for corrosive materials in Packing Groups II and III. The exceptions are generally the same as those now provided in the HMR. An additional exception is provided whereby materials, classed as Class 8, Packing Group III, solely because they are corrosive to aluminum, would not be subject to the HMR when transported by motor vehicle or rail.

Section 173.155. This section would provide limited quantity and consumer commodity exceptions for miscellaneous hazardous materials (Class 9). These materials are generally in Packing Group III. Exceptions from packaging requirements would be provided for outer packagings not exceeding 30 kg (661 pounds) gross weight and inner packagings with net capacities not over 4 liters (1.06 gallons) for liquids or 5.0 kilograms (11.02 pounds) for solids.

Section 173.156. This section would contain additional exceptions applicable to ORM–D materials when transported by a private or contract motor carrier from a distribution center to a retail outlet. These exceptions currently appear in § 173.505(b).

Since ORM–E materials would be subject to Packing Group III packaging requirements under this proposal, limited quantity provisions, identical to those for Class 9, are proposed for these materials.

5. Subpart E; Non-Bulk Packagings

A shift to the non-bulk packaging standards of the U.N. Recommendations is one of the original goals of Docket HM–181 and was the principal thrust of the ANPRM under this docket. The advantages of that system are discussed earlier in this proposal and are not repeated here, except to say that two principles from those arguments are used in the development of the non-bulk packaging authorizations. Those principles are: (1) materials of similar hazard are, in general, packaged in the same manner, and (2) any packaging which is suitable for a material because of the chemical and physical properties of the material is authorized for that material. In this notice, packagings are authorized even though they are not economical for use. Also, an attempt is made to avoid the practice of only authorizing those packagings which shippers have petitioned the Department to use. This happened extensively in the past as exemptions were converted into regulations. Exemption packagings often were suitable for other materials not covered by the exemption; but because those materials were not mentioned in the exemption, those packagings were not authorized for them when the exemption later was converted to a regulation.

In keeping with these principles, the majority of materials in the § 172.101 Table, when shipped in non-bulk packagings, are accommodated by eight packaging sections: three for liquids, three for solids, a general non-bulk section for materials not requiring DOT specification or U.N. standard packagings and a packaging section, for high hazard liquids, which authorizes only DOT specification gas cylinders. The three proposed general sections for

liquids, include one each for Packing Groups I, II, and III, and the three proposed general sections for solids include one each for Packing Groups I, II, and III. Packing Group II materials (liquid or solid) could be packaged in accordance with either the Packing Group I or II sections, and Packing Group III materials could be packaged in either Packing Group I, II, or III Packagings. (Note that for air shipments Packing Group III materials would have to be placed in packagings that meet Packing Group II performance levels.)

Sections 173.201–203 and 173.211–213. The proposed packaging sections for liquids are §§ 173.201, 173.202, and 173.203 and are, respectively, for Packing Group I, II, and III materials. Similarly, the proposed packaging sections for solids are §§ 173.211, 173.212, and 173.213, respectively, for Packing Group I, II, and III materials. Each section offers a number of combination and single packagings that provide roughly equivalent levels of packaging and that, in general, could be used for packaging a material of the packing group referenced by the section. It should be noted that other restrictions might apply either through the special provisions in the § 172.101 Table or through the general packaging requirements of Subpart B of Part 173. Also, for transportation aboard passenger-carrying aircraft, single packagings would not be authorized for Packing Group I or II materials.

As pointed out, each of the six proposed general sections is targeted for a particular packing group and offers an array of packagings of an equivalent level of packaging integrity. (For example, § 173.201 authorizes packagings for liquid materials in Packing Group I.) The equivalency among the various packagings is established by the performance tests which all of these packagings must meet. Packagings other than specification cylinders authorized in § 173.201 would have to meet the performance tests proposed in Subpart M of Part 178 at the Packing Group I level. For materials with a specific gravity of 1.2 or less, this would consist of a drop test at 1.8 meters (5.91 feet), a stacking test, a leakproofness test, and a hydrostatic pressure test with the pressure determined by the vapor pressure of the material or a specified minimum. In addition, plastic packagings would have to pass a chemical compatability test. Similarly, in §§ 173.202 and 173.203 equivalency would be established for the authorized array of liquid packagings at the Packing Group II and III levels, respectively, by the performance tests at those levels. For example, the drop test height for Packing Group II is 1.2 meters (3.94 feet) and for Packing Group III is 0.8 meters (2.62 feet). The same principles would apply to solid materials in §§ 173.211, 173.212 and 173.213.

Not all possible packagings are offered in each section. Proposed §§ 173.201, 173.202, and 173.203 all would authorize the 1A1 drum, for example, as a single unit packaging, but the wooden barrel, 2C2 is authorized for §§ 173.202 and 173.203 only. Similarly, §§ 173.212 and 173.213 authorize both the fiberboard box, 4G, and the fiber drum, 1G, as single unit packagings for solid materials, but neither is authorized by § 173.211. Thus, the system does not rely solely on the performance tests to establish packaging equivalency.

The proposed non-bulk packaging authorizations assigned in Column 8b of the § 172.101 Table usually are to one of the general packagings sections (i.e., § 173.201, 173.202, 173.203, 173.211, 173.212, or 173.213), based on the physical characteristics of the hazardous material and the assigned packing group. These packaging authorizations are not based on the material's hazard class, except to the extent that the hazard class reflects the physical state. For example, Class 3 materials are liquids and are not authorized in those packaging sections (§§ 173.211, 173.212, and 173.213) reserved for solids.

Section 173.204. Proposed § 173.204 is for liquid or solid materials which would not require packaging in conformance to any of the proposed U.N. standards; that is, non-specification or non-standard packaging would be authorized. This provision would apply to certain low hazard materials for which even Packing Group III performance levels are not considered necessary. The packaging restrictions for these materials would be those in Subpart B of Part 173, primarily § 173.24. These restrictions would be similar to those that now apply to use of non-specification packagings, as for limited quantities.

Section 173.205. Proposed § 173.205 is a packaging section which would authorize liquids, such as pentaborane, requiring a high level of package integrity, to be packaged in DOT specification gas cylinders.

Not all hazardous materials are accommodated by use of the general non-bulk packaging sections mentioned above. Because of unique physical, chemical or lethality problems, some materials require special handling. This notice proposes to handle these problem materials in one of two ways. The preferred system is to use one of the general non-bulk packaging sections and supplement it with special provisions found in Column 7 of the § 172.101 Table. The provisions beginning with the letter "N" apply to non-bulk packagings. For example, special provision "N5" states "Glass materials of construction are not authorized for any part of a packaging which is normally in contact with the hazardous material." So a Packing Group I liquid that attacks glass (such as hydrofluoric acid solution) is handled by specifying § 173.201 (Packing Group I liquids) and modifying it by specifying special provision "N5" in Column 7 of the § 172.101 Table.

Sections 173.158 through 173.229. The second, and less preferred method of dealing with these "problem" hazardous materials is to write a unique packaging section for the particular material. This notice proposes to do that where the general packaging sections, even modified by special provisions, are not adequate to safely package the material. There are approximately 42 sections between § 173.158 and § 173.229 which would cover the non-bulk packaging authorizations for particular materials or classes of materials or devices. Proposed § 173.158, for example, specified the authorized non-bulk packagings for nitric acid. Because of its special corrosive and oxidizing qualities, nitric acid requires special packaging materials. Stainless steel drums are one of the packagings used for it, and different alloys of stainless steel or different heat treatments of the same alloy are required for different strengths of nitric acid. Proposed § 173.158 lists these different requirements.

Machines and devices containing hazardous materials and the packagings for them are covered by special packaging sections because they usually cannot be packaged in ordinary hazardous material packagings, such as drums and boxes. For example, proposed § 173.174, covers refrigerating machines.

Section 173.225. Another proposed special packaging section, § 173.225, covers the packaging requirements for all organic peroxides (Division 5.2) in the § 172.101 Table. This consists of a table in § 173.225 which gives the ID number, Packing Group, Packaging Method (an alphanumeric code), and whether or not temperature control is required. There are approximately 145 organic peroxides in this list. To use the table, the shipper looks up the ID number for the organic peroxide in which he is interested in the table in § 173.225 and notes the Packing Group,

Packaging Method and whether or not the material is temperature controlled ("TC" in the right hand column). A second table in proposed § 173.225 lists the approved packagings associated with the Packaging Method code. The performance level of the packaging is given by the packing group from the first table. A shipper who is interested in an organic peroxide requiring temperature control (e.g., one requiring refrigeration) is referred to a requirement in § 173.21 (Forbidden materials and packages) which requires that the method of refrigeration be approved by the Director, OHMT, since materials requiring refrigeration for stability pose a significant hazard. Control temperatures would be specified under the conditions of the approval rather than appearing in the HMR. The proposed list of organic peroxides, their packing groups, their authorized packagings, and whether or not they are temperature controlled, is based on Chapter 11 of the U.N. Recommendations.

Sections 173.226 and 173.227. Two proposed sections (§§ 173.226 and 173.227) cover the non-bulk authorized packagings for Division 6.1, Packing Group I, materials that are toxic by inhalation. Proposed § 173.226 covers materials that fall into zone A of the inhalation toxicity Packing Group Borderlines graph (see proposed § 173.133), and proposed § 173.227 would cover materials that fall into zone B of the graph.

Proposed § 173.226 authorizes three distinct types or configurations of high-integrity packagings: a drum-within-a-drum configuration; U.N. standard combination packagings with an "inner packing system"; and gas cylinders. Proposed § 173.227 adds a fourth configuration: A single drum packaging. In the case of the drum-within-a-drum, both drums would have to be U.N. standard drums that meet Packing Group I performance tests. In addition, minimum thicknesses are specified for the inner and outer drums. The minimum thickness is specified because of the extreme toxicity of those materials. The single drum configuration authorized in proposed § 173.227 also has a minimum thickness requirement. In the case of the combination packagings, proposed § 173.226 would specify that each component (both the inner packaging system consisting of a combination packaging and the outer packaging) would have to withstand the Packing Group I performance tests without the benefit of the other packaging. In other words, each packaging must pass the performance tests alone. Both proposed sections would permit use of DOT specification cylinders in accordance with the provisions of proposed § 173.40.

6. Subpart F of Part 173; Bulk Packagings

The hazardous materials packaging sections in Part 173 of the HMR which authorize bulk packagings have evolved haphazardly throughout the years. Certain of these authorizations for particular materials provide a complete array of bulk packagings (tank cars, cargo tanks and portable tanks). In some sections, materials with similar transportation hazards are not authorized for similar bulk packagings due to oversight or because industry did not petition DOT to authorize them. In these cases safety is not the issue. Other sections, which reflect special permit or exemption experience, are very specific and only allow a limited array of bulk packagings when other types are just as suitable. Some sections authorize bulk packagings which are inappropriate for certain high hazard materials.

Sections 173.240 through 173.245. These variations and other inconsistencies prompted RSPA to develop for this proposal a method whereby a particular hazardous material can be matched with a group of bulk packagings which provide roughly equivalent levels of packaging integrity (referred to as "equivalent packagings" in this proposal). The matching of material and packaging is based on physical and chemical properties, hazard classification, secondary hazard assignment, and packing group. In order to understand this methodology, it is important to realize what is meant by equivalent bulk packagings and how this concept provides a means of easily matching a hazardous material with a package designed to safely contain the material in transportation. RSPA proposes to arrange the currently authorized specification bulk packagings (including Association of American Railroads (AAR) tank cars and marine portable tanks (MPT)) into new regulatory sections. While acknowledging that there are inherent differences in the specifications for each packaging, RSPA takes the position that the packagings can nonetheless be grouped into categories that provide equivalent levels of packaging integrity. The new sections begin by authorizing all bulk packagings for relatively low hazard materials and progressively eliminating those which are not suitable for the categories of hazardous materials which pose greater hazards.

The following table is a list of equivalent packagings:

Proposed sections	Tank cars	Cargo tanks	Portable tanks
§ 173.240	DOT, 103, 104, 105, 106, 107A, 109, 110, 111, 112, 113, 114, 115; AAR 203W, 206W, 207W; 211W; metal non-DOT spec. sift-proof tank cars and closed cars.	MC 300, 301, 302, 303, 304, 305, 306, 307, 310, 311, 312, 330, 331, 338; non-DOT spec. sift-proof cargo tanks and closed motor vehicles.	DOT 51, 52, 53, 56, 57, 60; marine portable tanks (MPT); non-DOT spec. sift-proof portable tanks and closed bins.
§ 173.241	DOT 103, 104, 105, 106, 107, 109, 110, 111, 112, 113, 114, 115, AAR 203W, 206W, 211W.	MC 300, 301, 302, 303, 304, 305, 306, 307, 310, 311, 312, 330, 331, 338; metal non-DOT spec. cargo tanks suitable for transport of liquids.	DOT 51, 52, 53, 56, 57, 60; MPT; metal non-DOT spec. portable tanks suitable for transport of liquids.
§ 173.242	DOT 103, 104, 105, 106, 107A, 109, 110, 111, 112, 113, 114, 115; AAR 206W.	MC 300, 301, 302, 303, 304, 305, 306, 307, 310, 311, 312, 330, 331, 338.	DOT 51, 52, 53, 56, 57, 60; MPT.
§ 173.243	DOT 103, 104, 105, 106, 107A, 109, 110, 111, 112, 113, 114, 115; (Gauging devices are required on DOT 103, 104, and 111.).	MC 310, 311 or 312 with design pressure (MAWP or MWP) of at least 25 psig; MC 304, 307, 330, 331, 338.	DOT 51, 60; MPT with design pressure (MAWP) of at least 25 psig.
§ 173.244	DOT 105, 106, 107A, 109, 110, 112, 113, 114	MC 330, 331, 338	DOT 51.
§ 173.245	DOT 105S500W, 112S500W (lagged); 105J500W, 106, 110, 112J500W; (Bottom outlets prohibited).	By approval only	By approval only.

While there are inherent differences in the individual specifications, RSPA believes that the level of integrity of packagings outlined above is equivalent, and that if a hazardous material can safely be carried in one type of cargo tank by highway, for instance, the authorization should be extended to all cargo tanks of similar or greater packaging integrity. A result of this type of packaging authorization is a general increase in the number of available authorized bulk packagings for a given material. RSPA has purposely ignored certain economic considerations in authorizing bulk packagings. For example, a shipper should be allowed to transport a flammable liquid with a subsidiary hazard in an MC 330 cargo tank rather than in an MC 307 cargo

tank even though this may not be economical.

Equivalent packagings are assigned to a hazardous material based on the material's hazard class, secondary hazard and packing group. These assignments reflect what is allowed in the regulations, as well as up-to-date toxicity, compatibility and other material-specific information. The following table represents the general method whereby hazardous materials are assigned bulk packaging sections:

Category of hazardous material (class or division number, packing group)	Proposed sections
Organic peroxides (Division 5.2)	No bulk packaging allowed.
Other high hazard materials, specifically identified.	
Poison A-type materials (Classes 2 and 6)	§ 173.245
Pyrophoric liquids (Division 4.2, PGI and 4.3, PGI).	§ 173.244
Compressed gases (Class 2)	
Poison B liquids (Division 6.1, PGI (inhalation)).	
Flammable liquids (Class 3, PGI)	
Poison B liquids (Division 6.1, PGI and II, (oral) and (dermal)).	§ 173.243
Pyrophoric liquids (Division 4.2, PGII and III; 4.3, PGII and III).	
Liquids with dual hazards (Classes 3, 4.2 PGII and III, 6.1).	
Liquid oxidizers (Division 5.1, PGI)	
Flammable liquids (Class 3, PGII and III)	§ 173.242
Corrosive liquids (Class 8, PGI and II)	
Poison solids (Division 6.1, PGI and II)	
Flammable solids (Divisions 4.2, PGI and 4.3, PGI).	
Flammable solids and poisonous materials (Divisions 4.1 and 6.1).	
Poison B liquids (Division 6.1, PGIII)	
Corrosive liquids (Class 8, PGIII)	§ 173.241
Flammable solids (Divisions 4.2, PGII and III, and 4.3, PGII and III).	
Oxidizers, solids in solution (Division 5.1, PGI; II and III).	
Oxidizers, liquid (Division 5.1, PGII and III)	
Combustible liquids (Class 3)	
ORM liquids	
Corrosive solids (Class 8, PGI, II and III)	§ 173.240
Poison solids (Division 6.1, PGIII)	
Oxidizers, solids (Division 5.1, PGI, II and III)	
Flammable solids (Division 4.1, PGI, II and III)	
ORM solids	

The equivalent packaging sections detailed above "fit" most hazardous materials listed in the § 172.101 Table. The result is that there are very few special sections devoted to bulk packagings for specific hazardous materials remaining in the regulations. Virtually all hazardous material entries are accommodated by the bulk packaging authorized in § 173.240 through § 173.245. Additional material-specific tailoring of packaging authorizations is made through special bulk packaging notes ("B" notes) in Column 7 of the § 172.101 Table. These notes are used to modify a particular packaging authorization based on material-specific needs.

Examples of bulk notes are as follows: "B6 Packagings shall be made of steel", "B16 The lading shall be completely covered with an inert gas", and "B2 MC 306 cargo tanks, DOT 57 portable tanks, and riveted tank cars are not authorized". Through the use of these notes, RSPA is able to eliminate numerous pages of repetitive regulatory text and standardize requirements.

Another type of note proposed in Column 7 of the § 172.101 Table is a "T" note. These notes apply to hazardous materials packaged in IM 101 and IM 102 portable tanks. The effect of the use of "T" notes is the elimination of the present IM Tank Table and associated interim authorizations issued by RSPA. If no "T" note appears, then use of IM portable tanks is not authorized for that material. If a "T" note is listed, it will prescribe a particular tank configuration, e.g., "IM 101, Test pressure—2.65 bars, bottom outlets prohibited, etc.". The proposed "T" notes and associated tank configurations are extracted directly from the U.N. tank container table. Deviations from the U.N. Recommendations for IM portable tanks occurs only for those hazardous materials which have been identified as being toxic by inhalation. These materials may not be transported in IM portable tanks. For consistency with the U.N., the pressure rating of the tank is noted in bars and is based on tank test pressure, not design pressure (MAWP). In the present IM Tank Table, the pressure referenced is the design pressure. The integrity of the tank is, nonetheless, the same since test pressure is equal to 150% of MAWP and this is taken into account in the "T" notes. Since test pressure is presently marked on IM tanks, this proposed change should present no problem.

In order to better understand the proposed bulk packaging authorizations outlined above, the following examples are provided:

Proper shipping name	Hazard class	UN ID#	Pkg.	Labels	Special provisions	Bulk pkg. auth.
Corrosive liquids, n.o.s.	8	UN 1760	I	CORROSIVE	B4, T42	242
			II	CORROSIVE	B2, T14	242
			III	CORROSIVE	T7	240

This is a single-hazard material which, in bulk, may be transported in any packaging listed in proposed § 173.242 or § 178.240, as appropriate. However, "B4" prohibits riveted tank cars, AAR 206 tank cars, MC 306 cargo tanks and DOT 57 portable tanks for Packing Group II materials. For the less corrosive Packing Group II materials, "B2" prohibits MC 306 cargo tanks and DOT 57 portable tanks, and riveted tank cars only. For Packing Group III materials, there are no "B" notes, and the entire packaging section, § 173.240, is authorized. Furthermore, since "T" notes are shown, IM portable tank carriage is allowed. "T42" permits use of IM portable tanks subject to approval by the Director, OHMT. Packing Groups II and III materials may be transported in IM tanks according to the exact tank configuration outlined in "T14" or "T7", as appropriate.

Proper shipping name	Hazard class	UN ID#	Pkg.	Labels	Special provisions	Bulk pkg. auth.
Corrosive liquids, poisonous, n.o.s.	8	UN 2922	I	CORROSIVE POISONOUS.		243
			II	CORROSIVE POISONOUS.		243
			III	CORROSIVE		241

This material is a dual hazard liquid. There are no bulk notes qualifying § 173.243, and each of the packagings listed may be used for Packing Groups I and II materials. Since no "T" notes are listed, IM portable tank movement would not be allowed for the material at any packing group level. Packing Group III materials may be transported according to the less restrictive § 173.241.

Proper shipping name	Hazard class	UN ID#	Pkg.	Labels	Special provisions	Bulk pkg. auth.
Cyclohexanone.	3	UN 1915	III	FLAMMABLE LIQUID.	B1, T1	242

This single-hazard material may have a flash point above 100°F. The "Special Provisions" entry appropriately shows "B1", a domestic exception for combustible liquids in bulk which allows them to be packaged under the less restrictive § 173.241, rather than § 173.242. In this situation the shipper must ascertain the flash point of the material and use either § 173.242 or § 173.241 (as provided for in "B1") accordingly. "T1" allows an IM 102 tank configuration.

Proper shipping name	Hazard class	UN ID#	Pkg.	Labels	Special provisions	Bulk pkg. auth.
Dimethylzinc	4.2	UN 1370	I	SPONTANEOUSLY COMBUSTIBLE.	B11, B16, T28, T29, T40.	244

This spontaneously combustible material may be transported in accordance with § 173.244 with a mandatory nitrogen or other inert gas blanket ("B16" and "T29"). Special provision "B11" imposes pressure requirements on tanks used for this material. Transportation is authorized in IM 101 portable tanks with "T28" configuration and 10mm shell and head thickness ("T40").

Proper shipping name	Hazard class	UN ID#	Pkg.	Labels	Special provisions	Bulk pkg. auth.
Ethyl chloroformate.	3	UN 1182	I	FLAMMABLE LIQUID, POISON & CORROSIVE.	10, B32	244

This flammable and corrosive liquid demonstrates a third hazard—toxic by inhalation. Recommendations will be made to the UN to change the hazard class of this and other underclassified materials to Division 6.1. This material must be packaged in conformance with the "10" note, which provides for inhalation hazard marking, and the "B32" note, which puts further restrictions on the cargo tanks and portable tanks authorized in § 173.244. The absence of a "T" note indicates that no importable tanks may be used.

While the majority of "B" notes are general in nature, "B30" through "B34" provide packaging criteria for liquids (Docket HM-196) and gases that are toxic by inhalation. Other hazardous materials that are toxic by inhalation but not originally listed in Docket HM-196 have been identified. Although there is no attempt to reclassify these materials in this notice, the proposed table reflects a change in packing group. All identified liquid materials are assigned to Packing Group I of the hazard class they are assigned in the U.N. Recommendations.

As indicated, "B30" through "B34" incorporate bulk packaging requirements for liquid materials and gases which demonstrate inhalation toxicity. The inhalation toxicity criteria for liquids are extracted from the U.N. Recommendations and parallel Division 6.1(i), Packing Groups I and II. In this notice, Packing Group I is further subdivided into Zones A and B to accommodate stricter packaging standards for the most toxic materials. See §§ 173.115, 173.116, 173.132, 173.133, 173.226 and 173.227 and the preamble of these sections for further discussions of classing, packing group assignments, and non-bulk packaging of Classes 2 and 6. Depending on the toxicity data for a particular liquid or gas, its new bulk packaging section is either § 173.245 or § 173.244 with appropriate "B" notes. More specifically, the following packaging criteria are proposed for these materials:

Liquids (Division 6.1(i))

(a) *Packing Group I, Zone B:* § 173.244 and notes "B14" and "B32" authorize DOT 105J300W, 112J340W and 114J340W tank cars, DOT 106 and 110 tank car tanks, MC 330 and 331 cargo tanks and DOT-51 portable tanks. Design pressure must be the greater of 1.3 times the vapor pressure at 115 °F. (46.1 °C.) or 100 psig (689.5 kPa). Minimum thickness for cargo tanks and portable tanks is 0.25 inch (6.35 mm) stainless steel or an equivalent thickness of carbon steel, determined in accordance with § 173.24b(c). Tanks must be insulated.

(b) *Packing Group I, Zone A:* § 173.244 and notes "B14" and "B30" authorize DOT 105J500W tank cars, DOT 106 and 110 tank car tanks, MC 330 and 331 cargo tanks and DOT 51 portable tanks. Design pressure must be the greater of 1.5 times the vapor pressure at 115 °F or 100 psig. Minimum thickness for cargo tanks and portable tanks is 0.30 inch (7.62 mm) stainless steel or an equivalent thickness of carbon steel, determined in accordance with § 173.24b(c). Tanks must be insulated.

2. Toxic Gases (Division 2.3)

(a) *Packing Group III:* § 173.244 and note "B34" authorize DOT Class 105, 109, 112 and 114 tank cars, DOT 106 and 110 tank car tanks, MC 330 and 331 cargo tanks and DOT 51 portable tanks. Design pressure must be the greater of 100 psig or 1.1 times the vapor pressure at 115 °F.

(b) *Packing Group II:* § 173.244 and notes "B14" and "B33" authorize DOT 105J300W, 112J340W and 114J340W tank cars, DOT 106 and 110 tank car tanks, MC 330 and 331 cargo tanks and DOT 51 portable tanks. Design pressure must be the greater of 1.2 time vapor pressure at 115 °F or 100 psig. Minimum thickness 0.25 inch stainless steel or an equivalent thickness of carbon steel, determined in accordance with § 173.24b(c). Tanks must be insulated.

(c) *Packing Group I, Zone B:* § 173.244 and note "B14" and "B31" authorize DOT 105J300W, 112J340W and 114J340W tank cars, DOT 106 and 110 tank car tanks, MC 330 and 331 cargo tanks and DOT 51 portable tanks. Design pressure must be the greater of 1.3 times the vapor pressure at 115 °F or 100 psig. Minimum thickness for cargo tanks and portable tanks 0.30 inch stainless steel or an equivalent thickness of carbon steel, determined in accordance with § 173.24b(c). Tanks must be insulated.

(d) *Packing Group I, Zone A:* § 173.245 authorizes DOT 105S500W, 112S500W, 105J500W and 112J500W tank cars and DOT 106 and 110 tank car tanks. Bottom outlets are prohibited and tanks must be insulated. Cargo tanks and portable tanks are authorized only as approved by the Director, OHMT.

Where the "B" note requires stainless steel but permits other steels, the minimum thickness of the shell and heads of each tank and portable tank constructed of a steel other than the reference stainless steel, would be obtained from the formula found in § 173.24b(c) as follows:

Formula for metric units:

$e_1 = (10e_o/Rm_1 A_1)^{1/3}$

Formula for nonmetric units:

$e_1 = (112.3e_o/Rm_1 A_1)^{1/3}$

where:

e_o = Required thickness of the reference stainless steel (from the "B" note) in millimeters or inches, as appropriate;

e_1 = Equivalent thickness of the steel used in millimeters or inches, as appropriate;

Rm_1 = Specified minimum tensile strength of the steel used (as specified in the appropriate specification in Part 178 of this subchapter in deka-newtons per square millimeter or pounds per square inch, as appropriate;

A_1 = Specified minimum percentage elongation of the steel used (as specified in § 178.270–3) multiplied by 100 (e.g., if 20% use 20.0).

Where the "B" note requires insulation (e.g., "B14"), each cargo tank and portable tank would have to be insulated with a suitable insulation material of such thickness that the overall thermal conductance is not more than 0.08 B.t.u. per square foot per degree F. differential in temperature per hour. The conductance would be determined at 60 °F. Insulation material would have to be corkboard or self-extinguishing polyurethane foam with minimum thickness of 4 inches.

Other noteworthy features applicable to bulk packaging are as follows:

(1) Bulk transportation of most organic peroxides would still be prohibited. Highly toxic gases (present Poison A materials) would still be prohibited in cargo tanks and portable tanks, except under the terms of approvals and exemptions.

(2) Bulk transportation of hydrogen peroxide in strengths of 52% or less but not less than 8% would become subject to the HMR, to correct a safety deficiency in the existing regulations.

(3) Section 173.24b would be added to add or clarify general requirements that would apply to bulk tank filling limits. The proposed changes standardize the minimum outage (ullage) in a bulk tank packaging and require the outage to be the largest of the following:

(a) For nonflammable liquids, one percent outage at the reference temperature (115 °F (46.1 °C) for uninsulated tanks, 105 °F (40.6 °C) for insulated tanks).

(b) For flammable liquids or poisonous liquids (not toxic by inhalation), two percent outage at the reference temperature (115 °F (46.1 °C) for uninsulated tanks, 105 °F (40.6 °C) for insulated tanks).

(c) For liquid materials that are toxic by inhalation, five percent outage at the reference temperature (115 °F (46.1 °C) for uninsulated tanks, 105 °F (40.6 °C) for insulated tanks).

(d) Tank must not be liquid full at 55 °C (131 °F).

The ullage for tanks in cryogenic liquid service is included in the filling density limits given in §§ 173.318 and 173.319.

(4) Sections 173.31 through 173.33 would be revised to assure that during normal transport conditions, no lading would be released due to an increase in vapor pressure caused by a rise in temperature of the lading. This is accomplished by relating tank pressure ratings and the associated opening pressures of pressure relief devices to lading pressure at maximum lading temperatures likely to be reached under "normal" transport conditions. These reference temperatures are 115 °F (46.1 °C) for insulated tanks and 105 °F (40.6 °C) for uninsulated tanks. The tank pressure rating for cargo tanks and DOT specification portable tanks (except IM 101 and IM 102) would remain the tank design pressure. The pressure rating for tank cars and U.N. multimodal tank container tanks (IM 101 and IM 102 portable tanks) would be the tank test pressure.

(5) Section 173.315 would be revised to provide additional integrity for tanks loaded with multiple-hazard ladings.

7. Subpart G; Gases, Preparation and Packagings

Section 173.300. This section would be removed since the definitions for gases would appear in proposed § 173.115.

Sections 173.300a through 173.305. These sections would not be changed.

Section 173.306. § 173.306 would be revised editorially and a new paragraph (h) would be added containing consumer commodity provisions which are currently located in §§ 173.505 and 173.1200. The latter sections would be deleted.

Section 173.307. This section would not be changed.

Section 173.308. The section reference in paragraph (a) would be changed from "§ 173.21(e)" to "§ 173.21(i)".

Section 173.314. Paragraph (a) would be revised to correct the section reference for definitions of gases. The introductory text of paragaph (f) would be revised for clarity and entries in the filling table which appear in paregraph (f) would be corrected.

Section 173.315. Subparagraph (a)(2) would be added to provide for the shipment of gases, other than those listed in the table in subparagraph (a)(1), in cargo tanks and portable tanks meeting the specified minimum design pressure requirements.

Sections 173.316 through 173.320. These sections would not be changed.

Sections 173.321 through 173.340. Subpart G would be extended beyond § 173.320 with the addition of ten proposed new sections. These sections would prescribe the authorized non-bulk packagings for specific gases, or categories of gases, as follows: § 173.321, ethylamine; § 173.324, ethyl methyl ether; § 173.334, organic phosphates mixed with compressed gas; § 173.335, gas generator assemblies; § 173.336, nitrogen dioxide, nitrogen peroxide, and nitrogen tetroxide liquids; § 173.337, nitric oxide; § 173.338, tungsten hexafluoride; and § 173.340, tear gas devices.

8. Subpart H

This subpart, which currently contains the definitions and packagings for poisonous materials and etiologic agents, would be rendered obsolete by previously discussed changes and, therefore, would be deleted.

9. Subpart I; Radioactive Materials

Requirements for radioactive materials remain essentially unchanged. As discussed in the preamble to Subpart C of Part 172, description requirements would change to reflect the numerical hazard class, Class 7. Definitions and packagings would not change, except as mentioned in the proposed changed to § 173.417. Within Subpart I, only §§ 173.416 and 173.417 would be revised.

Section 173.416. This section would be revised to correct section references to packaging specifications for radioactive materials which would be redesignated. See the preamble to Part 178 for discussion concerning redesignation of specifications.

Section 173.417. This section would be revised to correct section references to redesignated packagings. Also, in subparagraph (a)(6) the reference to a specification 6J or 17H drum would be changed to a 1A2 steel drum.

10. Subparts J, K, L, M, N, and O

These subparts, which address the definitions, preparation and packagings for ORM materials, would be rendered obsolete and, therefore, would be deleted.

11. Appendices to Part 173

Appendix A. Appendix A would not be changed.

Appendix B. Appendix B would be revised editorially to correct section references and to change the word "polyethylene" to "plastic" wherever it appears in the appendix.

Appendix C. A base level vibration test, which would appear as new Appendix C, is proposed. The test is essentially the same test which appears in the HMR in §§ 178.16 and 178.19 for Specifications 35 and 34, respectively. As discussed in the preamble to § 173.24, this basic vibration test would be made applicable to all non-bulk packagings used for hazardous materials. The test is neither sophisticated nor rigorous and is intended only to point out gross packaging deficiencies.

D. Parts 174 through 177; Carriers' Requirements

Although changes to the regulatory text in Parts 174, 175, 176 and 177 are needed to implement the proposals of this notice, they have not been included due to time constraints. Various sections in these parts would have to be revised editorially to correct section references and to conform to aforementioned changes in hazard class terminology and to placarding. In addition, loading and storage provisions would have to be revised to accommodate the new classification system.

Part 176. Although they do not represent all the changes necessary to implement the proposals of this notice, several proposed changes to Part 176 are included in this notice, as follows.

Section 176.5. This section would be revised to differentiate between "bulk packagings", as defined in § 171.8, and bulk carriage by vessel as addressed in Subchapters D, I, O, and N of Title 46.

Section 176.83. This section would be revised to add a definition for the term "clear of living quarters".

Section 176.84. This new section would contain the meaning and requirements of the stowage provisions, or codes, which appear in column 10c of the § 172.101 Table. There are approximately 100 different stowage provisions listed. The intent of these provisions is to align the § 172.101 Table stowage provisions with those in the IMDG Code. Some of these provisions use terms which are further defined in § 173.83. For example, code "37" is "Stow 'away from' hydrazine." The term "away from" is defined in § 176.83.

E. Part 178; Specifications for Packagings

1. Part 178, General

The changes proposed to Part 178 are essentially those which were proposed in the ANPRM, except for certain changes made in response to comments received and those made on RSPA's own initiative. One hundred specifications for non-bulk packagings would be eliminated and twenty packaging standards based on the U.N. Recommendations would be added. Performance tests generally based on the U.N. Recommendations would also be added. The title to Part 178 would be changed to reference "packagings" rather than "shipping containers". A number of subparts have been removed and reserved. RSPA will consider consolidation and recodification of Part 178 in the final rule.

Since issuance of the ANPRM, two issues that related to the performance testing of packagings have been resolved in separate rulemaking actions. Compatibility and permeation criteria, for hazardous materials packaged in polyethylene packagings, were established under Docket HM-185 (final rule published June 14, 1984; 49 FR 24684) and appear in 49 CFR at § 173.24(d) and Appendix B to Part 173, entitled "PROCEDURE FOR TESTING CHEMICAL COMPATIBILITY AND RATE OF PERMEATION IN POLYETHYLENE PACKAGINGS AND RECEPTACLES". These criteria would be retained, but would be applied to all plastics which might be used as packaging materials, rather than solely to polyethylene.

Under Docket HM-194 (final rule published March 13, 1985; 50 FR 10060), RSPA revised Subpart E of Part 107 to adopt procedures by which the Director, OHMT could designate third-party packaging testing agencies, for the purpose of certifying conformance of packaging designs with U.N. standards. Use of these independent testing agencies was left to the discretion of shippers and manufacturers. No changes to these provisions are proposed in this notice.

Section 178.0. Section 178.0-2 would be revised for clarity and to require that manufacturers notify, in writing, persons to whom packagings are transferred of any specification requirements which have not been met at time of transfer and of any actions which need to be taken to comply with specification requirements. Copies of the notifications must be retained by the manufacturer for at least one year.

RSPA considers this notice especially important in this proposal where performance-oriented packagings standards would replace specification packagings. Shippers will be performing many functions normally considered as part of manufacturing (e.g., assembling boxes or closing drums) should an incident occur, or an enforcement investigation, which revealed a packagings deficiency, it is important to be able to establish who was responsible for that deficiency. Specification marking requirements currently in § 173.24 are relocated to § 178.0-3 and this latter section is revised to address all specification markings. Whereas § 173.24 currently specifies a minimum size for specification markings of one half inch in height (except as otherwise provided in Part 178), proposed § 178.0-3 specifies a letter height of at least 6 millimeters (0.24 inches) for packagings having a capacity of less than or equal to 30 liters (7.9 gallons) for liquids or 30 kilograms (66.1 pounds) for solids and a letter height of at least 12 millimeters (0.47 inches) for other packagings.

2. Subparts A Through K; Non-Bulk Specification Packagings

Subpart A of Part 178. Subpart A contains seven specifications for carboys and two specifications for polyethylene drums. These specifications would be removed and Subpart A would be reserved.

Subpart B. Subpart B contains 18 specifications for inner receptacles and liners. Specifications 2P and 2Q are inner receptables for compressed gases and would be retained. Specification 2R is an inner packaging for radioactive materials. It would be relocated to Subpart K and be redesignated as § 178.360. The remaining specifications would be removed.

Subpart C. Subpart C contains specifications for cylinders and is not affected by this notice.

Subpart D. Subpart D contains 36 specifications for metal drums, kegs, overpacks and boxes and for Spec. 33A polystyrene cases. Four of the specifications (Specs. 6L, 6M, 20PF and 21PF) are packagings for radioactive materials. They would be moved to Subpart K and redesignated as §§ 178.352, 178.354, 178.356 and 178.358, respectively. The remaining specifications would be removed and the subpart would be removed and reserved.

Subpart E. Subpart I contains 22 specifications for wooden drums, barrels, boxes and overpacks. Two, Spec. 20WC and 21WC, are used for radioactive materials and would be redesignated and moved to Subpart K. The remaining specifications would be removed and Subpart E would be removed and reserved.

Subpart F. Subpart F contains 14 specifications for fiberboard boxes, drums and mailing tubes. The subpart would be removed and reserved.

Subpart G. Subpart G contains 9 specifications for paper, plastic and textile bags. The subpart would be removed and reserved.

Subpart H. In § 178.270–11, pressure relief device requirements for IM101 and IM102 intermodal tanks would be revised editorially to address pressure relief settings in terms of tank test pressure instead of mean average working pressure (MAWP).

Subpart K. Radioactive materials packagings from the aforementioned subparts would be relocated to Subpart K. No other changes are proposed in the subpart.

3. Subpart L; Non-Bulk Performance-Oriented Packaging Standards

A new Subpart L would be added to Part 178 containing marking requirements and packaging standards for non-bulk packagings based on Chapter 9 of the U.N. Recommendations.

Section 178.500. Proposed § 178.500 contains a general statement of scope and purpose and refers the user to § 171.8 for definitions of packaging terms.

Section 178.502. Proposed § 178.502 sets forth the identification codes for packagings as used in the U.N. Recommendations. For example, "4" designates a box and "G" designates fiberboard. Therefore, "4G" is the identification code for a fiberboard box.

Section 178.503. Proposed § 178.503 sets forth requirements for marking packages. In general, markings for the U.N. standards consist of the following nine elements:

(1) The U.N. symbol.

(2) The package identification code.

(3) A letter designating the packing group or groups for which the packaging has been performance tested.

(4) The specific gravity for liquids or the maximum gross mass for solids.

(5) The letter "S" to indicate that a packaging is intended for solids or the hydrostatic test pressure at which the packaging is rated.

(6) The last two digits of the year of manufacture.

(7) The letters "USA".

(8) The name and address or symbol of the manufacturer.

(9) For metal or plastic drums and jerricans intended for reuse, the thickness (in millimeters) of the packaging material.

In addition, reconditioned packagings would be marked with the following:

(1) The name of the country in which the reconditioning is performed.

(2) The name and address or symbol of the reconditioner.

(3) The month and last two digits of the year of reconditioning.

(4) The letter "R".

(5) If leakproofness tested, the letter "L".

In general, the proposed markings require more information on a packaging than is required currently. This additional information, such as packing group designation and hydrostatic test pressure rating, is believed necessary under this proposal for the shipper to be able to select a packaging appropriate for a specific hazardous material based on the characteristics of that material.

Sections 178.504 through 178.523. Sections 178.504 through 178.523 contain the standards for the 20 performance packagings which are proposed for adoption.

These standards specify the general requirements for materials, construction and capacity of packagings. As previously mentioned, they are more general than the existing specifications and give manufacturers wide latitude in designing and constructing packagings.

4. Subpart M; Testing of Nonbulk Packagings

There are presently wide differences in the application of test requirements in the various non-bulk packaging specifications in Part 178. Some specifications have no test criteria. Several have test criteria but no requirement to perform testing. Most have test requirements that must be performed at the start of production or upon change in design, materials or construction method and which must be repeated at intervals set forth in the individual specifications. For example, most of the metal drum specifications require testing to be repeated every four months. Some of the specifications call for production-oriented testing such as testing one packaging for every 1000 produced. Specific tests vary by type of packagings and, for similar types, from one specification to another.

Requirements for proof of testing also vary considerably. Proof of testing is not required for some specifications. Proof in the form of retained test samples is required for many specifications, including most of the metal and fiber drum specifications. Some specifications require filing of test reports with the Director, OHMT. Others require retention of test records at the manufacturer's location for periods ranging from four months to three years.

Section 178.601. In place of the existing hodgepodge of package testing and record retention requirements, proposed Subpart M standardizes requirements for all of the performance-oriented non-bulk packagings added in proposed Subpart L. In proposed § 178.601, general requirements for testing and test record retention are prescribed. Design qualification tests would be required at the start of production for each different packaging and "at intervals established by the manufacturer of sufficient frequency to ensure that all packagings are capable of passing the prescribed tests", except that tests would have to be repeated at least once each year that the packaging is produced. This would give the manufacturer the opportunity to determine effective test schedules for a particular manufacturing operation. Tests could be performed by the manufacturer or by an independent testing agency.

Retention of samples no longer would be required for any of the specifications. Manufacturers would be required to keep records of test results for one year. The format of these records would be left to the discretion of the individual manufacturers. Samples of each different packaging would have to be tested, with certain exceptions such as for packagings which differ only in surface treatment or in reduced height.

Proposed § 178.601 contains an approval provision whereby the Director, OHMT, may approve the selective testing of packagings that differ only in minor respects from the tested type, such as packagings which are produced with small reductions in dimensions. Another provision would permit the Director to require proof through testing that packagings meet specified requirements. It is envisioned that this testing would be performed by the manufacturer (with OHMT personnel or an independent inspector witnessing tests), by an independent testing agency, or by OHMT personnel.

Sections 178.602 through 178.608. Proposed § 178.602 contains general requirements for filling and conditioning packages in preparation for testing. Proposed §§ 178.603 through 178.606 contain requirements for the drop test, leakproofness test, hydrostatic pressure test and stacking test. These tests, based on the U.N. Recommendations, would apply to all of the performance-oriented packagings in proposed Subpart L. The leakproofness test would be performed on all packagings intended to contain liquids, except for the inner packagings of combination packagings. The drop test, hydrostatic pressure test and stacking test would be performed on representative samples of packagings, in accordance with the provisions of the specific test and the general test requirements of §§ 178.601 and 178.602. Proposed §§ 178.607 and 178.608 contain a cooperage test for bung-type wooden barrels and a chemical compatibility test for plastic receptacles.

It is believed that the proposed tests, in conjunction with the "beefed-up"

provisions in §§ 173.24 and 173.24a (including the vibration standard in § 173.24a(a)(5)) will ensure a level of packaging integrity equivalent or better than that provided by the existing DOT specification for non-bulk packagings. However, comments are solicited on whether these proposed tests are adequate or unnecessarily rigorous.

F. Part 179; Specifications for Tank Cars

Section 179.14. This section would be revised to update the list of approved couplers and to relocate performance requirements for coupler vertical restraint systems which currently appear in § 179.105–6.

Section 179.101–1. In the individual specification requirements table, the column for the DOT 112A400F tank car would be deleted and footnote 11 would be added to the "112A400W" column to accommodate these cars. The "Insulation" entries for DOT 112A200W, 112A340W, 112A400W, 112A500W, 114A340W, and 114A400W would be changed from "4 None" to "4, 13 Optional" to clarify that insulation is permitted on these cars. A footnote 13 would be added to permit cars to be stencilled to indicate conformance to the insulation provisions of § 179.100–18.

Section 179.102. This section, which specifies special commodity requirements for pressure tank cars, would be deleted. For bulk packagings, commodity-specific requirements would be accommodated through the special provisions in column 7 of the § 172.101 Table, and the packaging authorizations of Subpart F of Part 173.

Section 179.105. The provisions of § 179.105 would be revised to include DOT 105S, 105J and 111J tank cars. Section 179.105–1 would be editorially revised to address these tank cars and to delete references to implementation dates for coupler vertical restraint systems. Sections 179.105–2 and 179.105–3 contain obsolete implementation dates for coupler restraint systems and tank head puncture resistance systems, and would be removed. Section 179.105–4 would be revised to address DOT 105J and 111J tank cars. The requirements of § 179.105–6 would be relocated to § 179.14 and the section would be removed. Section 179.105–8 would be revised to add stencilling requirements for DOT 105S and 105J cars.

Section 179.106. The requirements of this section would be relocated to § 179.105, and the section would be deleted.

Section 179.202. This section, which specifies special commodity requirements for non-pressure tank cars, would be deleted. Commodity-specific requirements, where necessary, would be implemented through the special provisions in the § 172.101 Table and the bulk packaging authorizations in Subpart F of Part 173.

Section 179.203. In § 179.203–1, the requirements of paragraphs (c) and (d) would be relocated to § 171.12a and the paragraphs would be removed. In § 179.203–2, an obsolete reference in subparagraph (a)(1) would be removed.

Section 179.302. This section, which specifies special commodity requirements for multi-unit tank car tanks, would be deleted for the same reasons given for § 179.202.

VI. Enforcement of Performance-Oriented Packaging Standards

Inspection and enforcement of the regulations in Part 178 applicable to the manufacture of non-bulk packagings is a relatively uncomplicated process at the present time. Each individual specification provides the basis for the OHMT inspector to observe and compare a packaging with the requirements of the particular specification under which it was manufactured. If the manufacturer (or shipper or other person performing a manufacturing function) is not complying with the requirements of a specification, the inspector can determine this at the manufacturer's plant or at any point in the transportation process.

Under the proposed system of performance-oriented packaging standards, enforcement would become more complex. An inspector could no longer look to detailed specifications as the basis for inspecting a packaging facility. Although the manufacturer would still have to mark its packagings to indicate the type of service for which they are qualified, the most important determinant of qualification would be how well the packagings perform under test conditions. Thus, testing would become a critical factor in determining compliance under the proposed performance-oriented standards.

Under the proposed regulations, testing would increase in relative importance with random in-depth inspections of packagings by OHMT inspectors at freight terminals, intermodal transfer facilities, airports and other transportation facilities continuing to play an important role. However, while inspectors at such locations could continue to discover certain types of violations (e.g., improper markings, failure to use proper packagings for specific hazardous materials, etc.), in most instances they would be able to determine whether a specific package meets the required performance standards only by testing.

It should be noted that under the proposed regulations a shipper would have greater flexibility in selecting and combining packagings so long as required performance standards were met. This flexibility would be accompanied by a greater responsibility for the ultimate conformance of packaging with applicable requirements; thus, to the extent that the shipper would be performing manufacturer-type responsibilities, the shipper would be treated as a manufacturer and subject to enforcement as such. These proposed increased shipper responsibilities are described in proposed §§ 173.24, 173.24a, 173.24b and supplement the shipper responsibilities in § 173.22, which would not be changed. A balancing of manufacturer and shipper responsibilities would be provided by § 178.0–2(d), which proposes that manufacturers be required to notify recipients of their packagings of any actions which need to be taken in order for their packagings to conform to the regulations. The presence or absence of such a notice, as well as the thoroughness and accuracy of same, would be a major factor in determining whether and against whom to take enforcement action if nonconforming packages are found in commerce.

In light of the foregoing, if the performance standards proposed herein are adopted, it is likely that RSPA will focus its inspection efforts on packaging manufacturers' facilities (including shippers' facilities where they perform manufacturing functions) and testing-related activities. These activities would include review of packaging manufacturers' test records, observation of manufacturers' tests, and supervision of OHMT and OHMT-funded tests. Comments are solicited on these proposed changes to enforcement procedures.

Any testing program to determine compliance must have as its foundation a set of standard procedures by which to measure performance. For most existing DOT non-bulk specification packagings, OHMT's Enforcement Division has developed published test procedures and standards, in coordination with Wyle Laboratories, Huntsville, Alabama. These include test procedures and standards for DOT specification glass carboys, polyethylene bottles and containers, steel barrels and drums, fiberboard and wooden boxes, fiber drums, multiwall paper bags and several other types of packagings. These test procedures and standards are public information and are available from the National

Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

If the proposed rules are adopted, these previously developed test procedures and standards would be modified to reflect the specific performance standards promulgated in the final rule. As modified, these test procedures and standards would be used by OHMT's Enforcement Division as the basis for its monitoring, testing, and inspection program.

As noted above, if performance standards are adopted, testing for compliance would be the cornerstone of OHMT's enforcement effort relating to non-bulk packagings falling within the scope of the proposed regulations. There are, however, several alternative means of implementing a compliance testing program. These might include mandatory testing performed by manufacturers, shippers, independent testing agencies, or under the auspices of OHMT.

Suggestions concerning the means of carrying out such a testing program would be welcome. Commenters should be as specific as possible, indicate which approaches they believe would be more efficient, cost-effective, and fair to all concerned, and explain their conclusions. Specific comments might address such issues as government vs. contract laboratories, use of third-party testing or inspection agencies, test record retention requirements, the number of tests, and the appropriateness of OHMT or private parties bearing the costs of samples and testing.

In light of the proposed movement away from specific design criteria to more general performance standards, OHMT is committed to establishing enforcement procedures and policies which will encourage and ensure compliance with such standards. Since failure of a test may in any given case constitute *prima facie* evidence of noncompliance, enforcement action could be taken upon receipt of test results from a testing facility or after testing conducted at a manufacturing or shipping location. Such actions, of course, would be preceded by thorough investigation (possibly, by additional testing) to determine what caused the failure, whether a violation occurred, who committed it, and what the appropriate sanction should be.

Commenters should be aware that enforcement policies generally reflect internal agency decisions concerning the most effective and efficient means of enforcing the regulations. Obviously, the nature of the regulations themselves affects the determination of what types of enforcement approaches are most effective and efficient. Because of this relationship between the rules and enforcement policies, commenters should consider enforcement issues as part of this rulemaking. OHMT will consider all enforcement-related comments in determining to what extent the proposed regulations should be issued as final rules and in establishing policies for enforcing them.

If the regulations are issued substantially as proposed, OHMT may find it necessary to modify its enforcement policies in order to take into account experience it will have gained under those regulations.

VII. Transition Period

If the proposals contained in this notice lead to publication of a final rule, it is RSPA's intention to delay the effective date of that final rule, for most of the regulatory provisions contained therein, for five years from the date of publication. Voluntary compliance with the new requirements would be authorized immediately upon publication or as soon thereafter as is practicable. The five year period should facilitate the changeover from the present DOT specification system to the U.N. performance-oriented system for non-bulk packagings and mitigate the burden of complying with new or changed regulatory requirements, particularly with regard to hazard communication requirements. Assuming that a final rule would be published within two years of issuance of this notice, the voluntary compliance provision would permit shippers to change to the U.N. system prior to January 1, 1990, when existing grandfather provisions in international regulations terminate and DOT specification non-bulk packagings become virtually unacceptable in international commerce. It is anticipated that certain provisions of the final rule such as the conversion into general regulations of approval provisions for packagings for liquids which are toxic by inhalation, would be implemented over a transition period of less than five years.

VIII. Administrative Notices

A. Executive Order 12291

The effect of this rule, as proposed, does not meet criteria specified in section 1(b) of Executive Order 12291 and is, therefore, not a major rule, but is a significant rule under the regulatory procedures of the Department of Transportation [44 FR 11034]. This proposed rule does not require a Regulatory Impact Analysis, or an environmental impact statement under the National Environmental Policy Act [42 U.S.C. 4321 et seq.] A regulatory evaluation and flexibility analysis is available for review in the Docket.

B. Impact on Small Entities

Based on limited information concerning size and nature of entities likely affected by this proposed rule, I certify this proposal will not, if promulgated, have a significant economic impact on a substantial number of small entities. This certification is subject to modification as a result of a review of comments received in response to this proposal. A preliminary regulatory flexibility analysis is available for review in the docket.

C. Paperwork Reduction Act

Information collection requirements contained in this proposal are being submitted for approval to the Office of Management and Budget (OMB) under the provisions of the Paperwork Reduction Act of 1980 (Public Law 96-511).

D. Request for Comments

Comments are encouraged on all proposals contained in this notice. It is requested that interested persons submit comments concerning obvious errors and omissions as soon as possible so that a supplementary notice can be issued, if necessary, in a timely manner to address these errors and omissions. Substantive comments concerning specific proposals may be submitted at any time during the comment period.

RSPA is interested in receiving comments on incremental costs and benefits associated with specific proposals contained in this notice. Of particular interest are comments addressed to costs, benefits and burden hours associated with proposals related to information collection.

List of Subjects

49 CFR Part 171

Hazardous materials transportation, Definitions.

49 CFR Part 172

Hazardous materials transportation, Markings, Labels, Placards, Packaging.

49 CFR Part 173

Hazardous materials transportation, Packaging.

49 CFR Part 174

Hazardous materials transportation, Rail carriers.

49 CFR Part 175

Hazardous materials transportation, Air carriers.

49 CFR Part 176

Hazardous materials transportation, Maritime carriers.

49 CFR Part 177

Hazardous materials transportation, Motor carriers.

49 CFR Part 178

Hazardous materials transportation, Packaging specifications and standards.

49 CFR Part 179

Hazardous materials transportation, Tank cars.

In consideration of the foregoing, 49 CFR Parts 171 through 179 would be amended as follows:

PART 171—GENERAL INFORMATION, REGULATIONS, AND DEFINITIONS

The authority citation for Part 171 would continue to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1808; 49 CFR Part 1.

§ 171.3 [Amended]

In § 171.3, paragraph (e) preceding Note 1 would be removed.

Section 171.7 would be amended as follows:

In § 171.7, paragraph (d) would be removed and paragraph (c) would be revised to read as follows:

§ 171.7 Matter incorporated by reference.

* * * * *

(c) *Table of material incorporated by reference.* The following Table sets forth material incorporated by reference. It gives the name and address of the organization from which the material is available, the name of the material, and the section(s) of this subchapter, other than § 171.7, in which the matter is referenced.

Source and name of material	49 CFR reference
The Aluminum Association, 420 Lexington Avenue, New York, NY 10017:	
Aluminum Standards and Data, 1970-71, December 1969	178.65-5.
Aluminum Standards and Data, Sixth Edition, 1979	
Aluminum Standards and Data, Seventh Edition, June 1982	
American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018:	
ANSI B9.1-64, Safety Code for Mechanical Refrigeration, 1964 Edition	173.306.
ANSI B16.5-77 Steel Pipe Flanges, Flanged Fittings	178.360.
ANSI N14.1-71 Packaging of Uranium Hexafluoride for Transport, 1982 Edition	173.417.
American Society of Mechanical Engineers, United Engineering Center, 354 47th Street, New York, NY 10017:	
ASME Code, section VIII (Division 1) and IX of 1977 Edition of American Society of Mechanical Engineers Boiler and Pressure Code Addenda through December 31, 1979.	173.32; 173.33; 173.306; 178.315; 177.814; 178.245; 178.251; 178.255; 178.337; 178.340; 178.342; 178.343; and 179.400.
ASME Code, section V (FR Nonedestructive Examination, 1977	173.33.
ASME Code, section IX (FR Welding and Brazing Qualification 77 and Addendum 79)	178.245; 178.340.
American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103:	
Noncurrent ASTM Standards are available from: Engineering Societies Library, 354 E. 47th Street, New York, NY 10017:	
ASTM A 20-81 Standard Specification for General Requirements for Steel Plates for Pressure Vessels, Revision C, 1982	178.337.
ASTM A 47-68 Malleable Iron Castings	179.200.
ASTM A 53-69a Welded and Seamless Steel Pipe	179.12-2.
ASTM A 178-70 Electric Resistance Welded Carbon Steel Boiler Tubes	179.12.
ASTM A 192-69 Seamless Carbon Steel Boiler Tubes for High Pressure Service	179.12.
ASTM A 211-75 Standard Specification for Spiral-Welded Steel or Iron Pipe App. B	192.113; Part 192; 195.106.
ASTM A 240-82 Standard Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Fusion-Welded Unfired Pressure Vessels, Revision A.	173.57; 179.100; 179.200; 179.201; 179.220; 179.400.
ASTM A 242-81 Standard Specification for High-Strength Low-Alloy Structural Steel, 1982	179.100.
ASTM A 262-68 Recommended Practices for Detecting Susceptibility to Intergranular Attach in Stainless Steels	179.200.
ASTM A 269-69 Seamless and Welded Austenitic Stainless Steel Tubing for General Service	179.12.
ASTM A 285-78 Pressure Vessel Plates, Carbon Steel, Low and Intermediate-Tensile Strength	179.100; 179.200; 179.220; 178.300.
ASTM A 300-58 Steel Plates for Pressure Vessels for Service at Low Temperatures	178.337.
ASTM A 300-68 Notch Toughness Requirements for Normalized Steel Pressure Plates for Pressure Vessels	179.102.
ASTM A 302-78 Pressure Vessel Plates, Alloy Steel, Manganese-Molybdenum and Manganese-Molybdenum Nickel	179.100; 179.200; 179.200.
ASTM A 312-70a Seamless and Welded Austenitic Stainless Steel Pipe	179.12.
ASTM A 333-67 Seamless and Welded Steel Pipe for Low-Temperature Service	178.45.
ASTM A 370-77 Standard Methods and Definition for Mechanical Testing of Steel Products, 1982	179.102.
ASTM A 388-67 Ultrasonic Testing and Inspection of Heavy Steel Forging	178.45.
ASTM A 441-81 Standard Specification for High-Strength Low-Alloy Structural Manganese Vanadium Steel	178.338.
ASTM A 514-81 Standard Specification for High-Yield Strength Quenched and Tempered Alloy Steel Plate, Suitable for Welding	178.338.
ASTM A 515-69 Carbon Steel Plates for Pressure Vessels for Intermediate and Higher Temperature Service	179.100; 179.200; 179.220; 178.300.
ASTM A 516-79b Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate and Lower-Temperature Service, 1982 Edition.	178.337; 179.100; 179.102; 179.200; 179.220.
ASTM A 537-80 Standard Specification for Pressure Vessel Plates, Heat-Treated, Carbon-Manganese-Silicon Steel, 1982 Edition	179.100.
ASTM A 572-82 Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality, 1982 Edition	178.338; 179.100.
ASTM A 588-81 Standard Specification for High-Strength Low-Alloy Structural Steel with 50 Ksi Minimum Yield Point to 4 In. Thick	179.100; 178.338.
ASTM A 606-75 Standards Specification for Steel Sheet and Strip Hot-Rolled and Cold-Rolled, High-Strength, Low-Alloy, with Improved Atmospheric Corrosion Resistance, 1975 (Reapproved 1981).	178.338.
ASTM A 612-7a High Strength Steel Plates for Pressure Vessels for Moderate and Lower Temperature Service	178.337.
ASTM A 633-70a Standard Specification for Normalized High-Strength Low-Alloy Structural Steel, 1979 Edition	178.338.
ASTM A 715-81 Standard Specification for Steel Sheet and Strip, Hot-Rolled, High-Strength, Low-Alloy, with Improved Formability, 1981	178.338.
ASTM B 90-69 Magnesium Alloy Sheet and Plate	178.251.
ASTM B 161-70 Nickel Seamless Pipe and Tube, 1970	179.12.
ASTM B 162-69 Nickel Plate, Sheet, and Strip	179.200.
ASTM B 209-69 Aluminum Alloy Sheet and Plate	178.340; 179.100; 179.200; 179.220.
ASTM B 210-70 Aluminum Alloy Drawn Stainless Tables (FR B210-68(78))	179.12.
ASTM B 221-76 Aluminum Alloy Extruded Bars, Rods, Shapes and Tubes	179.12.
ASTM B 241-69 Standard Specification for Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube	179.12.
ASTM B 557-81 Tension Testing Wrought and Cast Aluminum and Magnesium-Alloy Products, 1979	178.251.
ASTM B 580-79 Standard Specification for Anodic Oxide Coatings on Aluminum, 1979	173.316; 173.318.
ASTM C 148-77 Standard Methods of Polariscopic Examination of Glass Containers, 1977	178.17.
ASTM D 56-79 Standard Method of Test for Flash point by Tag Closed Tester	173.120.
ASTM D 88-56 (Reapproved 80) Standard Method for Test of Saybolt Viscosity	173.120.
ASTM D 93-80 Standard Method of Test for Flash point by Pensky Martens Closed Tester	173.120.
ASTM D 323-58, 68 Vapor Pressure of Petroleum Products (Reid Methods)	173.119; 173.300.
ASTM D 1838-64 Copper Strip Corrosion by Liquefied Petroleum (LP) Gases	173.315.
ASTM D 2161-79 Conversion of Kinematic Viscosity to Saybolt Universal Viscosity or to Saybolt Furol Viscosity	173.120.
ASTM D 3243-73T Flash Point of Aviation Turbine Fuels by Setaflash Closed Tester	173.120.
ASTM D 3278-78 Flash Point of Liquids by Setaflash Closed Tester	173.120.
ASTM E 8-69 Tension Testing of Metallic Materials	178.45.

Source and name of material	49 CFR reference
ASTM E 8-81 Tension Testing of Metallic Materials	178.36; 178.37; 178.38; 178.39; 178.40; 178.41; 178.43; 178.44; 178.48; 178.49; 178.50; 178.51; 178.52; 178.53; 178.54; 178.55; 178.56; 178.57; 178.58; 178.59; 178.60; 178.61; 178.69; 178.251.
ASTM E 23-60 Notched Bar Impact Testing of Metallic Materials	178.57; 179.400.
ASTM E 112-63 Estimating the Average Grain Size of Metals	Part 178, App. A.
ASTM E 290-77 Semi-Guided Bend Test for Ductility of Metallic Materials	
ASTM E 487-74 Constant Temperature Stability of Chemical Materials	*173.21.*
ASTM E 681-79 Standard Test Method for Limits of Flammability of Chemicals	173.115.
ASTM G 26-70 Standard Recommended Practice for Operating Light-and-Water Exposure Apparatus (Xenon-Arc-Type) for Exposure of Nonmetallic Materials, 1970.	172.407; 172.519.
Association of American Railroads, 59 East Van Buren Street, Chicago, IL 60605:	
AAR Catalog Nos. F70BHT; F71BHT; F72BHT; F73BHT; F79BHT	179.14.
AAR Catalog Nos. SE60CHT; SE60CHTE; SE70CHT; SE70CHTE	179.14.
AAR Catalog Nos. F70CHT; F70CHTE; F73AHT; F73AHTE; F79CHT; F79CHTE	179.14.
AAR Catalog Nos. SE67BTH; SE67BTHE; SE68BTH; SE68BTHE; SF79CHT; SF79CHTE	179.14.
AAR Catalog Nos. SE60CHT; SE60CHTE; SE67BHT; SE67BHTE; SE68BHT; SE68BHTE	179.50.
AAR Catalog Nos. SE70CHT; SE70CHTE; SE79CHT; SE70CHTE	179.105.
AAR Specification for Design Fabrication and Construction of Freight Cars; September 1, 1964	179.100.
AAR Specification for Tank Cars, Specification M-1002, 1961	173.31.
AAR Specification for Tank Cars, September 1985, Exclusive of (1) pp. 28-80, AAR, Part 179, changes to DOT regulations proposed by AAR Committee on Tank Cars, and (2) DOT Regulations in Effect, October 1985.	179.6; 179.12; 179.100; 179.101; 179.102; 179.103; 179.105; 179.200; 179.201; 179.220; 179.300; 179.400.
American Water Works Association, 1010 Vermont Avenue, NW., Suite 810, Washington, DC 20005:	
AWWA Standard C207-55, Steel Pipe Flanges, 1955	173.360.
Bureau of Explosives, 1920 L Street NW., Washington, DC 20036:	
Closed Drum Apparatus (Test)	173.300.
Impact Apparatus (Test), January 24, 1961	173.63; 173.64; 173.65; 173.114.
Open Drum Apparatus (Test)	173.300.
Fetterley's Formula (The Determination of the Relief Dimensions for Safety Valves on Containers in which Liquefied gas is charged and when the exterior surface of the container is exposed to a temperature of 1,200 °F.).	173.315.
Flame Projection Test, 1958	173.300.
Pamphlet No. 6, Illustrating Methods for Loading and Bracing Carload and Less Than Carload Shipments of Explosives and Other Dangerous Articles, 1962.	174.101; 174.290; 174.112; 174.115.
Pamphlet 6A (includes Appendix No. 1, October 1944 and Appendix 2, December 1945), Illustrating Methods for Loading and Bracing Carload and Less Than Carload Shipments of Loaded Projectiles, Loaded Bombs, etc., 1943.	*174.101; 174.290.*
Pamphlet 6C, Illustrating Methods for Loading and Bracing Trailers and Less-Than Trailer Shipments of Explosives and Other Dangerous Articles Via Trailer-on-Flatcar (TOFC) or Container-on-Flat (COFC), September 1968.	174.55; 174.63; 174.101; 174.112; 174.115.
Pamphlets 1 & 2, Emergency Handling of Hazardous Materials in Surface Transportation; June 1973	177.861.
Canadian Transport Commission, 275 Slater Street, Ottawa, Ontario K1A 0N9:	
Canadian Transport Commission Regulations; 1974	171.12a; 172.401; 172.502; 174.11.
Chlorine Institute, Inc., 342 Madison Avenue, New York, New York 10017:	
Type 1/1/2 JQ 225, Dwg. H5-1970, October 7, 1968; or Type 1 1/2 JQ 225, Dwg. H50155, Revision A, April 28, 1969	173.315.
Standards for Angle Valves, and Dwg. 104-4, May 5, 1958 or Dwg. 104-5, September 1, 1972	173.33.
Standards for Excess Flow Valves, Dwg. 101-4, and 106-3, May 16, 1969, Dwg. 101-6, and 106-5, September 1, 1973	173.33.
Standards for Housing and Manway Covers for Steel Cargo Tanks Manufactured on or before December 31, 1974, Dwg. 177-1, November 7, 1962 or Dwg. 173-2, September 11, 1971; Tanks manufactured after January 1, 1975, Dwg. 137-2 (9/1/71).	173.337.
Compressed Gas Association, Inc., 1235 Jefferson Davis Highway, Arlington, Virginia 22202:	
CGA Pamphlet C-3, Standards for Welding and Brazing on Thin Walled Containers, 1975	178.47; 178.51; 178.54; 178.56; 178.57; 178.58; 178.60; 178.61; 178.68.
CGA Pamphlet C-6, Standards for Visual Inspection of Compressed Gas Cylinders, 1975	173.31; 173.34; 173.126.
CGA Pamphlet C-7, A Guide for the Preparation of Precautionary Markings for Compressed Gas Containers, Appendix A, May 15, 1972, and Addenda January 1976.	172.400.
CGA Pamphlet C-8, Standard for Requalification of DOT-3HT Cylinder Design, 1979	173.34.
CGA Pamphlet C-12, Qualification Procedure for Acetylene Cylinder Design, 1979	173.34; 173.303.
CGA Pamphlet C-14, Procedures for Fire Testing of DOT Cylinder Pressure Relief Device Systems, 1979	173.34.
CGA Pamphlet G-2.2, Tentative Standard Method for Determining Minimum of 0.2% Water in Anhydrous Ammonia, 1975	173.315.
CGA Pamphlet G-4.1, Cleaning Equipment for Oxygen Service, 1977	
CGA Pamphlet S-1.1, Pressure Relief Device Standards Part 1—Cylinders for Compressed Gases, 1979	173.34.
CGA Pamphlets S-1.2, Safety Relief Device Standards Part 2—and Portable Tanks for Compressed Gases, 1980	173.315; 173.318.
CGA Technical Bulletin TB-2, Guidelines for Inspection and Repair of MC-330 and MC-331 Cargo Tanks, 1975	173.33.
Department of Defense (DOD), 2461 Eisenhower Avenue, Alexandria, VA:	
DOD TB 700-2, Explosives Hazard Classification Procedures	173.86.
Department of Energy (USDOE) 1000 Independence Avenue SW., Washington, DC 20545:	
USDOE publications available from Superintendent of Documents, Government Printing Office (GPO) or The National Technical Information Service (NTIS)	
USDC, USDOE Materials and Equipment Specification No. SP, Revision 1 and Supplement Fire Resistent Phenolic Foam	178.120.
USAEC, ORO 651—Uranium Hexafluoride Handling Procedures and Container Criteria, Revision 3, 1972	173.417; 178.120; 178.121.
Department of Health and Human Services (DHHS), Public Health Service Center for Disease Control, National Institute for Occupational Safety and Health (NIOSH), Cincinnatti, Ohio 45226:	
NIOSH Registry—of Toxic Effects of Chemical Substances, 1978 (Available from the Superintendent of Documents (GPO)}S	172.203.
Department of Transportation (USDOT), 400 Seventh St., SW., Washington, DC 20590:	
Guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantity Shipments of Radioactive Materials [51 FR 5968 February 18, 1986] Effective March 20, 1986, HMT-166T.	177.825.
Fertilizer Institute, 1015 18th Street, Washington, DC 10036:	
Definitions and Test Procedures for Ammonium Nitrate Fertilizer (Revised May 7, 1971) January 16, 1973	174.510.
General Services Administration, Specification Office, Rm. 6662, 7th and D Street, SW., Washington, DC 20407:	
Federal Specification RR-C-901b, General 1-3	179.304.
Institute of Makers of Explosives, 420 Lexington Avenue, New York, NY 10017:	
IME Safety Library Publication No. 22 (IME Standard 22), Recommendation for the Safe Transportation of Detonators in a Vehicle with Certain Other Explosive Materials, January 1, 1985.	177.835.
International Atomic Energy Agency (IAEA), Wagramerstrasse 5, P.O. Box 100, A-1400, Vienna, Austria:	
Also available from: Unipub Incorporated, P.O. Box 433, New York, NY 10016:	
IAEA, Regulations for the Safe Transport of Radioactive Materials, Safety Series No. 6, 1973, Revised Edition (as amended)	171.12; 173.417.
International Civil Aviation Organization (ICAO), P.O. Box 400, Place de l'Aviation Internationale, 1000 Sherbrooke Street West, Montreal, Quebec, Canada H3A 2R2:	
ICAO Technical Instructions available from: INTEREG, International Regulations, Publishing and Distribution Organization, P.O. Box 60105, Chicago, IL 60660:	
Technical Instructions for the Safe Transport of Dangerous; Goods by Air, DOC 9284-AN/905 (1985) [50 FR 49394, December 2, 1985]	171.11; 172.401.
International Maritime Organization (IMO), 4 Albert Embankment, London, SE17SR, United Kingdom;	
or New York Nautical Instrument & Service Corporation, 140 W. Broadway, New York, NY 10013:	
International Maritime Dangerous Goods Codes, Volumes I, II, III, IV, 1977, and Amendments 14-76, 15-77, and 16-78, 17-79, 19-80, 20-82, 21-83 and 22-84 thereto.	171.12; 172.102; 172.401; 172.407; 176.5; 176.11; 176.27; 176.30.

Source and name of material	49 CFR reference
International Organization for Standardization, Case Postale 56, CH-1211, Geneve 20, Switzerland:	
Also available from: ANSI, 1430 Broadway, New York, NY 10018:	
ISO 82-197(e) Steel Tensile Testing, 1974	178.270-3.
ISO-2431-72	173.121.
ISO R780-1968	172.312.
National Association of Corrosion Engineers, 1440 South Creek, Houston, Texas 77084:	
NACE Standard TM-01-69, Test Method Laboratory Corrosion Testing of Metals for the Process Industries, 1969	173.500.
National Bureau of Standards, Department of Commerce, 5285 Port Royal Road, Springfield, VA 22151:	
USDC, NBS Handbook H-28 (1957), 1957 Handbook of Screw-Thread Standards for Federal Services, Part II, December 1966 Edition	178.45.
USDC, CAPE 1662, Civilian Applications Program Engineering Drawings (a package of information which includes drawings and bills of material, describing insulated, protective overpacks).	178.120; 178.121.
National Fire Protection Association, Batterymarch Park, Quincy, MA 02269:	
NFPA Pamphlet No. 58—Standard for the Storage and Handling of Liquefied Petroleum Gases, 1979	173.315.
National Motor Freight Traffic Association, Inc., Agent 1616 P Street, NW., Washington, DC 20036:	
National Motor Freight Classification NMF 100-1, 1982	177.841.
Nuclear Regulatory Commission, 1717 H Street, NW., Washington, DC 20555:	
(USNRC) 10 CFR Part 71, Packaging of Radioactive Material for Transport and Transportation of Radioactive Materials Under Certain Conditions.	173.417.
Society of Plastics Industries, Inc., Organic Peroxide Producers Safety Division, 355 Lexington Avenue, New York, NY 10017:	
Self Accelerating Decomposition Temperature Test, 1972	173.21.
Transport Canada, TDG Canadian Government Publishing Center, Supply and Services, Canada, Ottawa K1A 0S9:	
Transport of Dangerous Goods Regulations, as of July 1, 1985, incorporating Registration Numbers SOR/85-77, SOR85/585 and SOR/85-609.	171.12a; 172.401; 172.502.
Uniform Classification Committee, 222 South Riverside Plaza, Chicago, IL 60606:	
Uniform Freight Classification, (UFC), Rule 40, Section 5	173.620.
Uniform Freight Classification (UFC), Rule 41, Sections 2 and 3	173.620.
United Nations, United Nations Sales Section, New York, NY 10017:	
UN Recommendations for the Transport of Dangerous Goods, Forth Revised Edition (1986)	172.401; 172.407; 172.519.

* * * * *

In § 171.8, the following definitions and abbreviations would be added, revised, or removed as indicated, in appropriate alphabetical order:

§ 171.8 Definitions and abbreviations.

Add:

"Bag" means a flexible packaging made of paper, plastic film, textiles, woven material or other similar materials.

"Box" means a packaging with complete rectangular or polygonal faces, made of metal, wood, plywood, reconstituted wood, fiberboard, plastic, or other suitable material.

"Bulk packaging" means a packaging, including a transport vehicle, (1) having an internal volume greater than 450 liters (118.9 gallons) as a receptacle for a liquid, (2) having a capacity greater than 400 kilograms (881.8 pounds) as a receptacle for a solid, or (3) having a water capacity greater than 453.6 kilograms (1000.0 pounds) as a receptacle for a gas.

"Class" means hazard class. See "hazard class".

"Class 1" See § 173.50.

"Class 2" See § 173.115.

"Class 3" See § 173.120.

"Class 4" See § 173.124.

"Class 5" See § 173.128.

"Class 6" See § 173.132.

"Class 7" See § 173.403.

"Class 8" See § 173.136.

"Class 9" See § 173.140.

"Closure" means a device which closes an opening in a receptacle.

"Combination packaging" means a combination of packagings consisting of one or more inner packagings secured in a non-bulk outer packaging. It does not include a composite packaging.

"Composite packaging" means a packaging consisting of an outer packaging and an inner receptacle, so constructed that the inner receptacle and the outer packaging form an integral packaging. Once assembled it remains there after an integrated single unit; it is filled, stored, shipped and emptied as such.

"Crate" means an outer packaging with incomplete surfaces.

"Domestic transportation" means transportation between places within the United States other than through a foreign country.

"Dangerous when wet material" See § 173.124.

"Division" means a subdivision of a hazard class.

"Drum" means a flat-ended or convex-ended cylindrical packaging made of metal, fiberboard, plastic, plywood, or other suitable materials. This definition also includes packagings of other shapes made of metal or plastic (e.g., round taper-necked packagings or pail-shaped packagings) but does not include cylinders, jerricans, wooden barrels or bulk packagings.

"Hazard class" means the category of hazard assigned to a hazardous material under the defining criteria of Part 173 of this subchapter and the provisions of the § 172.101 Table.

"Infectious substance" See § 173.134.

"Inner packaging" means a receptacle which requires an outer packaging in order to perform its containment function.

"Inner receptacle" means a receptacle which requires an outer packaging in order to perform its containment function.

"International transportation" means transportation—

(1) Between any place in the United States and any place in a foreign country;

(2) Between places in the United States through a foreign country; or

(3) Between places in one or more foreign countries through the United States.

"Jerrican" means a metal or plastic packaging of rectangular or polygonal cross-section.

"kg" means kilogram.

"kPa" means kilopascal.

"L" means liter.

"Manufacturer" means a person who applies to a packaging a DOT specification marking or a United Nations mark (see § 178.503).

"Maximum capacity" means the maximum inner volume of receptacles or packagings.

"Maximum net mass" means the maximum net mass of contents in a single packaging or, as used in Subpart M of Part 178, the maximum combined mass of inner packagings and the contents thereof.

"mL" means milliliter.

"Non-bulk packaging" means a packaging (1) having an internal volume of 450 liters (118.9 gallons) or less as a receptacle for a liquid, (2) having a capacity of 400 kilograms (881.8 pounds) or less as a receptacle for a solid, or (3) having a water capacity of 453.6 kilograms (1000.0 pounds) or less as a receptacle for a gas.

"n.o.s. entry" means a shipping description from the § 172.101 Table which includes the abbreviation "n.o.s."

"Outer packaging" means the outermost enclosure of a composite or

combination packaging together with any absorbent materials, cushioning and any other components necessary to contain and protect inner receptacles or inner packagings.

"Pa" means pascal.

"Packing group" means a grouping according to the degree of danger presented by hazardous materials. Packing Group I indicates great danger; Packing Group II, medium danger; Packing Group III, minor danger. See § 172.101(f).

"Poisonous materials" See § 173.132

"Primary hazard" means the hazard class of a material, as assigned in the § 172.101 Table.

"Receptacle" means a containment vessel for receiving and holding materials, including any means of closing.

"Specification packaging" means a packaging conforming to one of the specifications or standards for packagings in Part 178 or Part 179 of this subchapter.

"Strong outer (or outside) packaging" means a packaging which meets or exceeds the performance requirements of § 173.24 of this subchapter applicable to non-specification packagings, either as a single packaging or as the outer packaging of a combination packaging.

"Subsidiary hazard" means a hazard of a material other than the primary hazard. See "primary hazard".

"Table in § 172.101" or "§ 172.101 Table" means the Hazardous Materials Table in § 172.101 of this subchapter.

"UN" means United Nations.

"Wooden barrel" means a packaging made of natural wood, of round cross-section, having convex walls, consisting of staves and heads and fitted with hoops.

"UN standard packaging" means a specification packaging conforming to the requirements in Subparts L and M of Part 178.

Revise

"Bottle" means a receptacle having a neck of relatively smaller cross section than the body and an opening capable of holding a closure for retention of the contents.

"Cargo aircraft only" means an aircraft that is used to transport cargo and is not engaged in carrying passengers. For purposes of this subchapter, the terms "cargo aircraft only", "cargo-only aircraft" and "cargo aircraft" have the same meaning.

"Combustible liquid" See § 173.120.

"Compressed gas" See § 173.115.

"Corrosive material" See § 173.136.

"Etiologic agent" See § 173.134.

"Flammable gas" See § 173.115

"Flammable liquid" See § 173.120.

"Flammable solid" See § 173.124.

"Flash point" means the minimum temperature at which a substance gives off flammable vapors which, in contact with sparks or flame, will ignite. (For criteria, see § 173.121.)

"Gross weight" or "Gross mass" means the weight of a packaging plus the weight of its contents.

"Limited quantity" when specified as such in a section applicable to a particular material, means the maximum amount of a hazardous material for which there is a specific labeling and packaging exception.

"Magnetic material" See § 173.21(d).

"Marking" means descriptive name, identification number, instructions, cautions, weight, specification, or UN marks, or combinations thereof, required by this subchapter on outer packagings of hazardous materials.

"Name of contents" means the proper shipping name as specified in § 172.101.

"Net weight", "Net mass", or "Net quantity" means the mass or volume of hazardous material contained in a package, excluding the weight or volume of any packaging material, except in the case of explosive devices where the net weight is the weight of the finished device excluding packagings. See also "maximum net mass".

"Organic peroxide" See § 173.128.

"ORM" means other regulated material. See § 173.144.

"Oxidizer" See § 173.128.

"Package" means the complete product of the packing operation, consisting of the packaging and its contents as prepared for transport. For radioactive materials, see § 173.403 of this subchapter.

"Packaging" means a receptacle and any other components or materials necessary for the receptacle to perform its containment function and to ensure compliance with the minimum packing requirements of this subchapter. For radioactive materials, see § 173.403 of this subchapter.

"Pyrophoric liquid" See § 173.124(b).

"Spontaneously combustible material" See § 173.124(b).

"Water reactive material" see "Dangerous when wet material."

Remove

NRC
Outside container
Poison A
Poison B
Pyrophoric solid
STC

The title and text of § 171.10 would be revised to read as follows:

§ 171.10 Hazardous materials in bulk on board vessels or barges.

Except for transportation in bulk packagings (as defined in § 171.8 of this Part), the requirements of this subchapter do not apply to the bulk carriage of hazardous materials by vessel or barge. See 46 CFR Subchapters D, I, O and N for requirements applicable to bulk carriage by vessel or barge.

§ 171.11 [Amended]

In § 171.11, paragraphs (d)(4)(i) and (d)(4)(ii) would be removed, and paragraphs (d)(4)(iii) and (d)(4)(iv) would be redesignated as (d)(4)(i) and (d)(4)(ii), respectively.

In § 171.12, paragraphs (c), (d) and (f) would be removed, paragraph (e) would be redesignated as paragraph (c) and paragraph (b) would be revised to read as follows:

§ 171.12 Import and export shipments.

* * * * *

(b) Except for radioactive materials and explosives other than Class 1.4, a material which is packaged, marked, classed, labeled and described in accordance with the IMDG Code when being imported into or exported from the United States, or passing through the United States in the course of being shipped between places outside the United States, may be offered and accepted for transportation and transported within the United States if it is otherwise offered, accepted and transported in accordance with this subchapter, including the placarding requirements of Subpart F of Part 172. The provisions of this paragraph also apply to transportation, a portion of which includes transportation by vessel, between points in a State or between States.

* * * * *

§ 171.12a [Amended]

Section 171.12a would be amended as follows:

1. In paragraph (a) introductory text, the reference to "paragraph (b)" is changed to paragraphs (b) and (g)";

2. In paragraph (d), the introductory phrase preceding the word "specification" is changed to read "Except as specified in paragraph (g) of this section and § 173.301(i) of this subchapter,"

3. In paragraph (e) the reference to "paragraph (a)" is changed to read "paragraphs (a) and (g)".

In § 171.12a, the introductory text of paragraph (b)(2) would be revised and paragraph (g) would be added, as follows:

§ 171.12a Canadian shipments and packagings.

* * * * *

(b) * * *

(2) A material or article meeting the definition for Class 1 (explosives) according to this subchapter, except that, notwithstanding the requirements of Part 172 of this subchapter—

* * * * *

(g) Tank cars used under the provisions of this section must conform to the following requirements:

(1) Each class CTC–105, 112, and 114 tank car shall be equipped with a coupler vertical restraint system in accordance with § 179.14 of this subchapter.

(2) After December 31, 1987, each tank car which does not conform to a DOT specification shall be equipped with a coupler vertical restraint system in accordance with § 179.14 of this subchapter.

§ 171.14 [Removed]

Section 171.14 would be removed.

PART 172—HAZARDOUS MATERIALS TABLE, SPECIAL PROVISIONS AND HAZARDOUS MATERIALS COMMUNICATIONS REGULATIONS

The authority citation for Part 172 would continue to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1808; 49 CFR Part 1, unless otherwise noted.

The index to Part 172 would be revised to read as follows:

Subpart A—General

Sec.
172.1 Purpose and scope.
172.3 Applicability

Subpart B—Table of Hazardous Materials and Special Provisions

172.101 Purpose and use of hazardous materials table.
172.102 Special provisions.

Appendix A to Subpart B—Identification Number Cross Reference to Proper Shipping Names in the § 172.101 Table

Subpart C—Shipping Papers

172.200 Applicability.
172.201 General entries.
172.202 Description of hazardous material on shipping papers.
172.203 Additional description requirements.
172.204 Shipper's certification.
172.205 Hazardous waste manifest.

Subpart D—Marking

172.300 Applicability
172.301 General marking requirements for non-bulk packagings.
172.302 General marking requirements for bulk packagings.
172.303 Prohibited marking.
172.304 Marking requirements.
172.306 Consignee's or consignor's name and address.
172.308 Authorized abbreviations.
172.310 Radioactive materials.
172.312 Liquid hazardous materials in non-bulk packagings.
172.313 Poisonous hazardous materials.
172.316 Packagings containing material classed as ORM–D or ORM–E.
172.324 Hazardous substances in non-bulk packagings.
172.326 Portable tanks.
172.328 Cargo tanks.
172.330 Tank cars and multi-unit tank car tanks.
172.332 Identification number markings.
172.334 Identification numbers; special provisions and exceptions.
172.338 Replacement of identification numbers.

Subpart E—Labeling

172.400 General labeling requirements.
172.400a Exceptions from labeling.
172.401 Prohibited labeling.
172.402 Additional labeling requirements.
172.403 Radioactive material.
172.404 Labels for mixed and consolidated packagings.
172.405 Authorized label modifications.
172.406 Placement of labels.
172.407 Label specifications.
172.411 EXPLOSIVE 1.1, 1.2, 1.3, 1.4 and 1.5 labels.
172.415 NON-FLAMMABLE GAS label.
172.416 POISON GAS label.
172.417 FLAMMABLE GAS label.
172.419 FLAMMABLE LIQUID label.
172.420 FLAMMABLE SOLID label.
172.422 SPONTANEOUSLY COMBUSTIBLE label.
172.423 DANGEROUS WHEN WET label.
172.426 OXIDIZER label.
172.427 ORGANIC PEROXIDE label.
172.430 POISON label.
172.431 KEEP AWAY FROM FOOD label.
172.432 INFECTIOUS SUBSTANCE label.
172.436 RADIOACTIVE WHITE-I label.
172.438 RADIOACTIVE YELLOW-II label.
172.440 RADIOACTIVE YELLOW-III label.
172.442 CORROSIVE label.
172.448 CARGO AIRCRAFT ONLY label.

Subpart F—Placarding

172.500 Applicability of placarding requirements.
172.502 Prohibited and permissive placarding.
172.503 Identification number display on placards.
172.504 General placarding requirements.
172.505 Multiple placarding.
172.506 Providing and affixing placards: Highway.
172.507 Special placarding provisions: Highway.
172.508 Placarding and affixing placards: Rail.
172.510 Special placarding provisions: Rail.
172.512 Freight containers and aircraft unit load devices.
172.514 Bulk packagings other than tank cars.
172.516 Visibility and display of placards.
172.519 General specifications for placards.
172.521 DANGEROUS placard.
172.522 EXPLOSIVES 1.1, EXPLOSIVES 1.2 and EXPLOSIVES 1.3 placards.
172.523 EXPLOSIVES 1.4 placard.
172.524 EXPLOSIVES 1.5 placard.
172.525 Standard requirements for the RESIDUE placard.
172.527 Background requirements for certain placards.
172.528 NON-FLAMMABLE GAS placard.
172.532 FLAMMABLE GAS placard.
172.540 POISON GAS placard.
172.542 FLAMMABLE placard.
172.544 COMBUSTIBLE placard.
172.546 FLAMMABLE SOLID placard.
172.547 SPONTANEOUSLY COMBUSTIBLE placard.
172.548 DANGEROUS WHEN WET placard.
172.550 OXIDIZER placard.
172.552 ORGANIC PEROXIDE placard.
172.553 KEEP AWAY FROM FOOD placard.
172.554 POISON placard.
172.556 RADIOACTIVE placard.
172.558 CORROSIVE placard.

Appendix A to Part 172—Office of Hazardous Materials Transportation Color Tolerance Charts and Tables

Appendix B to Part 172—[Reserved]

Appendix C to Part 172—Dimensional Specifications for Recommended Placard Holder

In Part 172, §§ 172.101 and 172.102 would be revised, as follows:

Subpart B—Table of Hazardous Materials and Special Provisions

§ 172.101 Purpose and use of hazardous materials table.

(a) The Hazardous Materials Table (Table) in this section designates the materials listed therein as hazardous materials for the purpose of transportation of those materials. For each listed material, the Table identifies the hazard class or specifies that the material is forbidden in transportation, and gives the proper shipping name or directs the user to the preferred proper shipping name. In addition, the Table specifies or references requirements in this subchapter pertaining to labeling, packaging, quantity limits aboard aircraft and stowage of hazardous materials aboard vessels.

(b) *Column 1: Symbols.* Column 1 of the Table contains six symbols as appropriate: Plus (+) and the letters "A", "D", "E", "I" and "W".

(1) The plus (+) fixes the proper shipping name and the hazard class for that entry without regard to whether the material meets the definition of that class. An alternate proper shipping name and hazard class may be authorized by the Director, OHMT.

(2) The letter "A" restricts the application of requirements of this subchapter to materials offered or intended for transportation by aircraft unless—

(i) The letter "E" also appears with it and the material is a hazardous substance; or

(ii) The material is a hazardous waste.

(3) The letter "D" identifies proper shipping names which are appropriate for describing materials for domestic transportation but may be inappropriate for international transportation under the provisions of international regulations (e.g., IMO, ICAO). Except for hazardous substances or hazardous wastes classed as ORM–E materials, an alternate proper shipping name may be selected when international transportation is involved.

(4) The letter "E" identifies a material which is subject to the requirements of this subchapter, regardless of the mode of transportation or hazard class, if it is a hazardous substance (as defined in § 171.8 of this subchapter). A hazardous substance which does not meet the defining criteria for another hazard class remains subject to certain requirements of this subchapter as an ORM–E.

(5) The letter "I" identifies proper shipping names which are appropriate for describing materials in international transportation. An alternate proper shipping name may be selected when only domestic transportation is involved.

(6) The letter "W" restricts the application of requirements of this subchapter to materials offered or intended for transportation by vessel unless—

(i) The letter "E" also appears with it and the material is a hazardous substance; or

(ii) The material is a hazardous waste.

(c) *Column 2: Hazardous materials descriptions and proper shipping names.* Column 2 lists the hazardous materials descriptions and proper shipping names of materials designated as hazardous materials. Modification of a proper shipping name may otherwise be required or authorized by this section. Proper shipping names are limited to those shown in Roman type (not italics).

(1) Proper shipping names may be used in the singular or plural and in either capital or lower case letters.

(2) The words in italics are not part of the proper shipping name but may be used in addition to the proper shipping name. The word "or" in italics indicates that any terms in the sequence may be used as the proper shipping name as appropriate.

(3) The abbreviation "n.o.i." or "n.o.i.b.n." may be used interchangeably with "n.o.s.".

(4) Except for hazardous wastes, when qualifying words are used as part of the proper shipping name, their sequence in the package markings and shipping paper description is optional. However, the entry in the Table reflects the preferred sequence.

(5) Except for a material classed as an organic peroxide, when one entry references another entry by use of the word "*see*", if both names are in Roman type, either name may be used as the proper shipping name (e.g., Ethyl alcohol. *See* Ethanol). However, the referenced entry is preferred. For a material classed as an organic peroxide, the technical name shall be used as the proper shipping name. An organic peroxide formulation that is not listed by its technical name, shall be described as "organic peroxide, mixture", "Organic peroxide, sample, n.o.s.", or "organic peroxide, trial quantities, n.o.s.", as appropriate.

(6) When a proper shipping name includes a concentration range as part of the shipping description, the actual concentration, if it is within the range stated, may be used in place of the concentration range. For example, an aqueous solution of hydrogen peroxide containing 30 percent peroxide may be described as "Hydrogen peroxide, aqueous solution *with not less than 20 percent but not more than 40 percent hydrogen peroxide*" or "Hydrogen peroxide, aqueous solution *with 30 percent hydrogen peroxide*".

(7) Use of the prefix "mono" is optional in any shipping name when appropriate. Thus, Iodine monochloride may be used interchangeably with Iodine chloride. In "Glycerol alpha-monochlorohydrin" the term "mono" is considered a prefix to the term "chlorohydrin" and may be deleted.

(8) The numbers in italics following a proper shipping name of a material identified by the letter "E" in Column 1 specify, in pounds and kilograms, the minimum quantity of that material, excluding water and other formulating materials, which constitutes a reportable quantity, for purposes of determining whether the material is a hazardous substance as defined in § 171.8 of this subchapter. For example: Ammonia solution *(RQ–1000/454)* means that the reportable quantity for the ammonia is 1,000 pounds or 454 kilograms. Any formulating material identified by the letter "E" in Column 1 of the Table and used in a mixture or solution shall be evaluated independently for the RQ determination. For example, if Mevinphos *(RQ–1/0.454)* is mixed with Xylene *(RQ–1000/454)* and is in a 10-pound package described as "Organophosphorus pesticide, liquid, flammable, toxic, n.o.s." Mevinphos could be in that package in a reportable quantity, but there could not be a reportable quantity of the Xylene present in that package. Except as otherwise provided, a material in a hazard class other than ORM–E is subject to the requirements of this subchapter even if not packaged in a reportable quantity. A material in the ORM–E class that is neither a hazardous substance nor a hazardous waste (see § 171.8 of this subchapter) is not subject to the requirements of this subchapter.

(9) If the word "waste" is not included in the hazardous material description in Column 2 of the Table, the proper shipping name for a hazardous waste (as defined in § 171.8 of this subchapter shall include the word "Waste" preceding the proper shipping name of the material. For example: Waste acetone.

(10) A mixture or solution comprised of a hazardous material identified in the Table by technical name and nonhazardous material may be described using the proper shipping name of the hazardous material, if—

(i) The mixture or solution is not specifically identified in the Table;

(ii) The hazard class of the mixture or solution is the same as that of the hazardous material; and

(iii) The qualifying word "mixture" or "solution", as appropriate, is added as part of the proper shipping name. *Example:* A solution of Acetone, mineral oil, and water, meeting the definition of a flammable liquid, may be described under this optional provision as "Acetone solution, 3, UN 1090, PG II."

(11) Except for a material subject to or prohibited by §§ 173.21, 173.51, 173.86(d), 173.86(e)(1) or 173.114a(g)(2) of this subchapter, a material for which the hazard class is uncertain and must be determined by testing or a material that is a hazardous waste may be assigned a tentative shipping name, hazard class and identification number, based on the shipper's tentative determination according to—

(i) Defining criteria in this subchapter;

(ii) The hazard precedence prescribed in § 173.2a of this subchapter; and

(iii) The shipper's knowledge of the material.

(12) Except when the proper shipping name in the Table is preceded by a plus (+)—

(i) If it is specifically determined that a material meets the definition of a hazard class other than the class shown in association with the proper shipping name, the material shall be described by an appropriate proper shipping name listed in association with the correct class for the material.

(ii) If an appropriate technical name is not shown in the Table, selection of a proper shipping name shall be made

from the generic descriptions or "n.o.s." entries corresponding to the specific hazard class of the material. The name that most appropriately describes the material shall be used; e.g., an alcohol not listed by its technical name in the Table shall be described as "Alcohol, n.o.s." rather than "Flammable liquid, n.o.s.". Some mixtures may be more appropriately described according to their application, such as "Coating solution" or "Extract, flavoring, liquid", rather than by an "n.o.s." entry, such as "Flammable liquid, n.o.s.". It should be noted, however, that an n.o.s. entry as a proper shipping name may not provide sufficient information for shipping papers and package markings. Under the provisions of Subparts C and D of this part, the technical name of the constituent which makes the product a hazardous material may be required in association with the proper shipping name.

(iii) If a material meets the definition of more than one hazard class, and is not identified in the Table by a specific description or a dual hazard "n.o.s." entry (e.g., "Flammable liquid, corrosive, n.o.s."), the hazard class of the material shall be determined by using the precedence specified in § 173.2a of this subchapter, and an appropriate shipping description shall be selected as described in paragraph (c)(12)(ii) of this section.

(iv) If it is specifically determined that a material is not a forbidden material and does not meet the definition of any hazard class, the material is not a hazardous material.

(13) When the proper shipping name in the Table is preceded by the letter "D", the hazardous material may be described by an "n.o.s." entry or generic proper shipping name in place of the more specific technical name. However, the technical name of the hazardous material shall be entered in association with the proper shipping name, when appropriate, as for a hazardous substance.

(d) *Column 3: Hazard class.* Column 3 contains a designation of the hazard class or division corresponding to each proper shipping name, or the word "Forbidden".

(1) A material for which the entry in this column is "Forbidden" may not be offered for transportation or transported. This prohibition does not apply if the material is diluted, stabilized or incorporated in a device and it is classed in accordance with the definitions of hazardous materials contained in Part 173 of this subchapter.

(2) When a reevaluation of test data or new data indicates a need to modify the "Forbidden" designation or the hazard class specified for a material specifically identified in the Table, this data should be submitted to the Director, OHMT.

(3) A basic description of each hazard class and the section reference for class definitions appear in § 173.2 of this subchapter.

(e) *Column 4: Identification number.* Column 4 lists the identification number assigned to each proper shipping name. Those preceded by the letters "UN" are associated with proper shipping names considered appropriate for international transportation as well as domestic transportation. Those preceded by the letters "NA" are associated with proper shipping names not recognized for international transportation, except to and from Canada. Identification numbers in the "NA9000" series are associated with proper shipping names not appropriately covered by international hazardous materials (dangerous goods) transportation standards, or not appropriately addressed by international transportation standards for emergency response information purposes, except for transportation between the United States and Canada.

(f) *Column 5: Packing group.* Column 5 specifies the packing group(s) assignment for a material conforming to the associated hazard class and proper shipping name. Classes 1 and 7 and Divisions 2.1 and 2.2 of Class 2 do not have packing groups. Packing groups I, II and III indicate the degree of danger presented by the material is either great, medium or minor, respectively. If more than one packing group is indicated for an entry, the packing group for the hazardous material is determined using the criteria for assignment of packing groups specified in Subpart D of Part 173. When a reevaluation of test data or new data indicates a need to modify the specified packing group(s), the data should be submitted to the Director, OHMT.

(g) *Column 6: Labels.* Column 6 specifies the hazard warning label(s) required for a package filled with a material conforming to the associated hazard class and proper shipping name, unless the package is otherwise excepted from labeling by provisions in Subpart D of Part 172, or Part 173 of this subchapter. The first label shown for each entry is indicative of the primary hazard of the material, additional labels are indicative of subsidiary hazards. Provisions in § 172.402 may require that a label other than that specified in Column 6 be affixed to the package in addition to that specified in Column 6.

(h) *Column 7: Special provisions.* Column 7 specifies codes for special provisions applicable to hazardous materials. When Column 7 refers to a special provision for a hazardous material, the meaning and requirements of that special provision are as set forth in § 172.102.

(i) *Column 8: Packaging authorizations.* Columns 8a, 8b and 8c specify the applicable sections for exceptions, non-bulk packaging requirements and bulk packaging requirements, respectively, in Part 173 of this subchapter. Columns 8a, 8b and 8c are completed in a manner which indicates that "§ 173." precedes the designated numerical entry. For example, the entry "202" in column 8b associated with the proper shipping name "Gasoline" indicates that for this material conformance to non-bulk packaging requirements prescribed in § 173.202 of this subchapter is required. When packaging requirements are specified, they are in addition to the standard requirements for all packagings prescribed in § 173.24 of this subchapter and any other applicable requirements in Subparts A and B of Part 173 of this subchapter.

(1) *Exceptions.* Column 8a contains exceptions from some of the requirements of this subchapter. The referenced exceptions are in addition to those specified in Subpart A of Part 173 and elsewhere in this subchapter. A "None" in this column means no packaging exceptions are authorized, except as may be provided by special provisions in Column 7.

(2) *Non-bulk packaging.* Column 8b references the section in Part 173 of this subchapter which prescribes packaging requirements for non-bulk packagings. A "None" in this column means non-bulk packagings are not authorized, except as may be provided by special provisions in Column 7. Each reference in this column to a material which is a hazardous waste or a hazardous substance, and whose proper shipping name is preceded in column 1 of the Table by the letter "A" or "W", is modified to include "§ 173.204" on those occasions when the material is offered for transportation or transported by a mode in which its transportation is not otherwise subject to requirements of this subchapter.

(3) *Bulk packaging.* Column 8c specifies the section in Part 173 of this subchapter which prescribes packaging requirements for bulk packagings other than IM portable tanks. A "None" in this column means bulk packagings are not authorized, except as may be provided by special provisions in Column 7. Authorizations for use of IM portable tanks are set forth in Column 7.

(j) *Column 9: Quantity limitations.* Columns 9a and 9b specify the maximum quantities that may be offered for transportation in one package by passenger-carrying aircraft or rail car (Column 9a) or by cargo aircraft only (Column 9b), subject to the following:

(1) "Forbidden" means the material may not be offered for transportation or transported in the applicable mode of transport.

(2) The quantity limitation is "net" except where otherwise specified, such as for "Consumer commodity" which specifies "65 lbs. gross."

(3) When articles or devices are specifically listed by name, the net quantity limitation applies to the entire article or device (less packaging and packaging materials) rather than only to its hazardous components.

(4) A package offered or intended for transportation by aircraft and which is filled with a material forbidden on passenger-carrying aircraft but permitted on cargo aircraft only, or which exceeds the maximum net quantity authorized on passenger-carrying aircraft, shall be labelled with the CARGO AIRCRAFT ONLY label specified in § 172.448 of this Part.

(k) *Column 10: Vessel stowage requirements.* Columns 10a (Cargo vessel) and 10b (Passenger vessel) specify the authorized stowage locations on board vessels. Column 10c (Other stowage provisions) specifies codes for stowage requirements for specific hazardous materials. The meaning of each code in Column 10c is set forth in § 176.84 of this subchapter. Section 176.63 of this subchapter sets forth the physical requirements for each of the authorized locations listed in columns 10a and 10b. (For bulk transportation by vessel, see 46 CFR Parts 30 to 40, 70, 98, 148, 151, 153 and 154.) The authorized stowage locations specified in Columns 10a and 10b are defined as follows:

(1) "1" means the material shall be stowed "on deck."

(2) "2" means the material must be stowed "under deck."

(3) "3" means the material must be stowed "under deck away from heat."

(4) "1,2" means the material may be stowed "on deck" or "under deck." However, "under deck" stowage should be used, if available.

(5) "1,3" means the material may be stowed "on deck" or "under deck away from heat." However, "under deck away from heat" stowage should be used, if available.

(6) "4" means the material may be transported on a passenger vessel in only the quantity specified in column 9a of the Table, and is subject to the stowage requirements specified for a cargo vessel for the same material.

(7) "5" means the material is forbidden and may not be offered for transportation or transported by vessel.

(8) "6" means the material shall be transported in a magazine subject to the requirements of §§ 176.135 through 176.144 of this subchapter.

(l) *Changes to the Table.* (1) Unless specifically stated otherwise in the amendment or the "Effective date" entry in its preamble, if any entry in this Table is changed by an amendment to this subchapter—

(i) Such a change does not apply to the shipment of any package filled prior to the effective date of the amendment; and

(ii) Stocks of preprinted shipping papers and package markings may be continued in use, in the manner previously authorized, until depleted or for a one-year period, subsequent to the effective date of the amendment, whichever is less.

(2) A shipping description or any associated entry which is listed in the § 172.101 Table may be altered, if the alteration is approved by the Director, OHMT.

(3) A shipping description or any associated entry which is listed in the current edition of the IMDG Code but is not listed in the § 172.101 Table may be used as if it were listed in the Table, if approved by the Director, OHMT.

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Accellerene, see p-Nitrosodimethylaniline													
	Accumulators, electric, see Batteries, wet etc.													
D	Accumulators, pressurized (*pneumatic or hydraulic*) containing non-flammable gas.	2.2	NA1956		NONFLAMMABLE GAS.		306	306	None	No limit	No limit	1,2	1,2	
	Acetal	3	UN1088	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	5	12
E	Acetaldehyde (*RQ-1000/454*)	3	UN1089	I	FLAMMABLE LIQUID.	B16, N1, N15, T20, T26, T29.	None	201	243	Forbidden	30 L	1,3	5	12
AE	Acetaldehyde ammonia (*RQ-1000/454*)	9	UN1841	III	None		155	204	241	200 kg	200 kg	1,2	1,2	34
	Acetaldehyde oxime	3	UN2332	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1,3	
E	Acetic acid, glacial *or* Acetic acid solution, *more than 80 per cent acid, by weight* (*RQ-1000/454*).	8	UN2789	II	CORROSIVE	B2, N1, N11, N26, N35, T8.	154	202	242	1 L	30 L	1,3	1,3	21
DE	Acetic acid solution *10 percent or less* (*RQ-1000/454*).	ORM-E	NA2790	III	None		156	203	241	1 L	30 L	1,2	1,2	
E	Acetic acid solution, *more than 10 per cent but not more than 80 per cent acid, by weight* (*RQ-1000/454*).	8	UN2790	II	CORROSIVE	B2, N1, N11, N26, N35, T8.	154	202	242	1 L	30 L	1,2	1,2	
E	Acetic anhydride (*RQ-1000/454*)	8	UN1715	II	CORROSIVE	B2, N1, N11, N26, N35, T8.	154	202	242	1 L	30 L	1,3	1,3	21, 40, 77
	Acetone	3	UN1090	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	5	
E	Acetone cyanohydrin (*RQ-10/4.54*)	6.1	UN1541	I	POISON	B14, B32, N1, N16, N34, 10.	None	227	244	Forbidden	Forbidden	1	5	25, 26, 27, 40, 95
	Acetone oils	3	UN1091	II	FLAMMABLE LIQUID.	T7, T30	150	202	242	5 L	30 L	1,3	1	
	Acetonitrile, see Methyl cyanide													
	Acetyl acetone peroxide (3,5-Dimethyl-3,5-dihydroxydioxolane-1,2), *not more than 40 per cent in solution and not more than 9% by weight active oxygen.*	5.2	UN2080	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Acetyl acetone peroxide, (3,5-dimethyl-3,5-dihydroxydioxonate-1,2), *not more than 32% as a paste with not less than 44% solvent, not less than 9% water and not less than 11% inert solid.*	5.2	UN3061	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	2
	Acetyl acetone peroxide with more than 9% by weight active oxygen.	Forbidden												
	Acetyl benzoyl peroxide, *not more than 40 per cent in solution.*	5.2	UN2081	II	ORGANIC PEROXIDE.		None	225	None	5 L	10 L	1	5	12, 40
	Acetyl benzoyl peroxide, solid, or more than 40% in solution.	Forbidden												
E	Acetyl bromide (*RQ-5000/2270*)	8	UN1716	II	CORROSIVE	B2, T12, T26.	154	202	242	1 L	30 L	1	1	80, 40
E	Acetyl chloride (*RQ-5000/2270*)	3	UN1717	II	FLAMMABLE LIQUID, CORROSIVE.	N1, N11, N16, N26, N34, T18, T26.	None	202	243	1 L	5 L	1,3	1	40
	Acetyl cyclohexanesulfonyl peroxide, more than 82 per cent wetted with less than 12 per cent water.	Forbidden												
	Acetyl cyclohexanesulfonyl peroxide, *not more than 32 per cent in solution.*	5.2	UN2083	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Acetyl cyclohexanesulfonyl peroxide, *not more than 82 per cent, wetted with not less than 12 per cent water.*	5.2	UN2082	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Acetylene, dissolved	2.1	UN1001		FLAMMABLE GAS.		None	303	None	Forbidden	15 kg	1	1	25, 40, 57, 93
	Acetylene (liquefied)	Forbidden												
	Acetylene silver nitrate	Forbidden												
	Acetylene tetrabromide, see Tetrabromoethane.													
	Acetyl iodide	8	UN1898	II	CORROSIVE	B2, T9	154	202	242	1 L	30 L	1	1	80, 40
	Acetyl methyl carbinol	3	UN2621	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Acetyl peroxide, *see* Diacetyl peroxide, *etc.*													
	Acid butyl phosphate, see Butyl acid phosphate.													
D	Acid, liquid, n.o.s.	8	NA1760	II	CORROSIVE	B2	154	202	242	1 L	5 L	1,2	1	
	Acid, sludge, *see* Sludge acid													
	Acridine	4.1	UN2713	III	FLAMMABLE SOLID.	A1	151	213	240	25 kg	100 kg	1,3	1,3	40
	Acrolein dimer, stabilized	3	UN2607	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1,3	
E	Acrolein, inhibited (*RQ-1/0.454*)	3	UN1092	I	FLAMMABLE LIQUID, POISON.	B14, B30, 10.	None	226	244	Forbidden	Forbidden	1,3	5	12, 40

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Acrylamide	6.1	UN2074	III	KEEP AWAY FROM FOOD.	T8	153	213	240	100 kg	200 kg	1,2	1,2	12, 25, 34
	Acrylic acid, inhibited	8	UN2218	II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1	1	80, 12, 21, 25, 40
E	Acrylonitrile, inhibited (*RQ-100/45.4*)	3	UN1093	I	FLAMMABLE LIQUID, POISON.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,3	5	12, 40
	Actuating cartridge, explosive, see Cartridges, power device.													
	Adhesives, *containing flammable liquid*	3	UN1133	II	FLAMMABLE LIQUID.	T7, T30	150	173	242	5 L	60 L	1,3	1	12
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	173	242	60 L	220 L	1,3	1,3	12
DE	Adipic acid (*RQ-5000/2270*)	ORM-E	NA9077	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Adiponitrile	6.1	UN2205	III	KEEP AWAY FROM FOOD.	T1	153	203	241	60 L	220 L	1,2	1,2	25, 34
	Aerosols, corrosive, n.o.s., *each not exceeding 1L capacity.*	2.2	UN1950		NONFLAMMABLE GAS, CORROSIVE.		None	302, 304, 305	None	75 kg	150 kg	1,3	1,3	40, 48, 85
	Aerosols, flammable, n.o.s. (*each not exceeding 1 L capacity*).	2.1	UN1950		FLAMMABLE GAS.		306	302, 304, 305	None	75 kg	150 kg	1,3	1,3	40, 48, 85
	Aerosols, non-flammable, n.o.s. (*each not exceeding 1 L capacity*).	2.2	UN1950		NONFLAMMABLE GAS.		306, 307	302, 304, 305	None	75 kg	150 kg	1,3	1,3	48, 85
	Aerosols, poison, n.o.s., *each not exceeding 1L capacity.*	2.3	UN1950	II	POISON GAS	10	None	302, 304, 305	None	Forbidden	Forbidden	1,3	1,3	40, 48, 85
	Air, compressed	2.2	UN1002		NONFLAMMABLE GAS.	B13	306	302	244	75 kg	150 kg	1,3	1,3	85
	Aircraft evacuation slides, *see* Life rafts, *etc.*													
D	Aircraft hydraulic power unit fuel tank (*containing a mixture of anhydrous hydrazine and monomenthyl hydrazine*) (*M86 fuel*).	3	NA9302	I	FLAMMABLE LIQUID, POISON, CORROSIVE.		None	172	None	Forbidden	42 L	1,3	5	
	Aircraft survival kits, *see* Life rafts, *etc.*													
	Aircraft thrust device *to assist take-off*	4.1	UN2791	II	FLAMMABLE SOLID.		None	180	None	Forbidden	250 kg	1,3	5	
	Air, refrigerated liquid, *low pressure or pressurized.*	2.2	UN1003		NONFLAMMABLE GAS, OXIDIZER.		320	316	318, 319	Forbidden	150 kg	1,3	1,3	55, 51, 85
	Air, refrigerated liquid, *non-pressurized*	2.2	UN1003		NONFLAMMABLE GAS, OXIDIZER.		320	316	318, 319	Forbidden	Forbidden	1,3	1,3	85
	Alarm devices, explosive, *automatic*	1.4S	UN0001											
	Alcoholic beverages	3	UN3065	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
				III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60	202 L	1,3	1,3	
	Alcohols, n.o.s.	3	UN1987	II	FLAMMABLE LIQUID.	T8, T31	150	202	242	5 L	60 L	1,3	1	12
				III	FLAMMABLE LIQUID.	T7, T30	150	203	242	60 L	220 L	1,3	1,3	12
	Alcohols, toxic, n.o.s.	3	UN1986	II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	12, 40
	Aldehydes, n.o.s.	3	UN1989	II	FLAMMABLE LIQUID.	T8, T31	150	202	242	5 L	60 L	1,3	1	12
				III	FLAMMABLE LIQUID.	T7, T30	150	203	242	60 L	220 L	1,3	1,3	12
	Aldehydes, toxic, n.o.s.	3	UN1988	II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	5	12, 40
	Aldol	6.1	UN2839	II	POISON	T8	None	202	243	5 L	60 L	1,3	1,3	12, 25, 95
DE	Aldrin (*RQ-1/0.454*)	6.1	NA2761	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
DE	Aldrin, *RQ 1/0.454*	6.1	NA2762	II	POISON		None	212	243	5 L	60 L	1,3	1,3	
	Alkali metal alloys, liquid, n.o.s.	4.3	UN1421	I	DANGEROUS WHEN WET.	A2, N1, N15, N34.	None	201	244	Forbidden	1 L	1	5	
	Alkali metal amalgams, liquid	4.3	UN1389	I	DANGEROUS WHEN WET.	A2, N1, N15, N34.	None	201	244	Forbidden	1 L	1,3	1,3	
	Alkali metal amalgams, solid n.o.s.	4.3	UN1389	I	DANGEROUS WHEN WET.	A2, N1, N15, N34.	None	211	242	Forbidden	15 kg	1,3	1,3	
	Alkali metal amides	4.3	UN1390	II	DANGEROUS WHEN WET.	A19, A20, N2, N11, N26.	None	212	241	15 kg	50 kg	1,3	5	40
	Alkali metal dispersions *or* Alkali earth metal dispersions.	4.3	UN1391	I	DANGEROUS WHEN WET.	A2, N1, N15, N34.	None	201	244	Forbidden	1 L	1	5	
	Alkaline corrosive liquids, n.o.s., see Caustic alkali liquids, n.o.s.													
	Alkaline earth metal alloys, n.o.s.	4.3	UN1393	II	DANGEROUS WHEN WET.	A19	None	212	241	15 kg	50 kg	1,3	5	
	Alkaline earth metal amalgams	4.3	UN1392	I	DANGEROUS WHEN WET.	A19, N34	None	211	242	Forbidden	15 kg	1,3	1,3	
	Alkaloids, n.o.s., *or* Alkaloid salts, n.o.s., *poisonous liquid.*	6.1	UN1544	I	POISON		None	201	243	1 L	30 L	1,2	1,2	95
				II	POISON		None	202	243	5 L	60 L	1,2	1,2	95
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	
	Alkaloids, n.o.s., *or* Alkaloid salts, n.o.s., *poisnous solid.*	6.1	UN1544	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
	Alkylamines, n.o.s. *or* Polyalkylamines, n.o.s., *corrosive, flammable.*	8	UN2734	I	CORROSIVE, FLAMMABLE LIQUID.	N1; N11, N34, T8, T31.	None	201	243	.5 L	2.5 L	1,3	1,3	22
				II	CORROSIVE, FLAMMABLE LIQUID.	T8, T31	None	202	243	1 L	30 L	1,3	1,3	22
	Alkylamines, n.o.s. *or* Polyalkylamines, n.o.s., *flammable, corrosive.*	3	UN2733	I	FLAMMABLE LIQUID, CORROSIVE.	T42	None	201	243	.5 L	2.5 L	1,3	1	40
				II	FLAMMABLE LIQUID, CORROSIVE.	T8, T31	None	202	243	1 L	5 L	1,3	1	40
				III	FLAMMABLE LIQUID, CORROSIVE.	B1, T8, T31.	None	203	242	5 L	60 L	1,3	1,3	
	Alkylamines, n.o.s, *or* Polyalkylamines, n.o.s., *corrosive.*	8	UN2735	I	CORROSIVE	B4, N1, N11, N34, T42.	None	201	242	.5 L	2.5 L	1,2	1	
				II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1,2	1,2	
				III	CORROSIVE	T8	154	203	241	5 L	60 L	1,2	1,2	
	Alkyl, Aryl *or* Toluene sulfonic acid, liquid, *with more than 5 per cent free sulfuric acid.*	8	UN2584	II	CORROSIVE	B2, T8, T27.	154	202	242	1 L	30 L	1,2	1	9
	Alkyl, Aryl *or* Toluene sulfonic acid, liquid, *with not more than 5 per cent free sulfuric acid.*	8	UN2586	III	CORROSIVE	T8	154	203	241	5 L	60 L	1,2	1	9
	Alkyl, Aryl *or* Toluene sulfonic acid, solid, *with more than 5 per cent free sulfuric acid.*	8	UN2583	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	
	Alkyl, Aryl *or* Toluene sulfonic acid, solid, *with not more than 5 per cent free sulfuric acid.*	8	UN2585	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
	Alkyl phenols, n.o.s. (*including C2-C8 homologues*) *liquid.*	6.1	UN2430	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34
	Alkyl phenols, n.o.s. (*including C2-C8 homologues*) *solid.*	6.1	UN2430	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Allethrin, see Pesticides, liquid, toxic, n.o.s.													
	Allyl acetate	3	UN2333	II	FLAMMABLE LIQUID, POISON.	T8	None	202	243	1 L	60 L	1,3	5	12, 40, 94
E	Allyl alcohol (*RQ-100/45.4*)	3	UN1098	I	FLAMMABLE LIQUID, *POISON.*	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,3	5	40
	Allylamine	3	UN2334	I	FLAMMABLE LIQUID, POISON.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,3	5	12, 40

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Allyl bromide	3	UN1099	I	FLAMMABLE LIQUID, POISON.	T18	None	201	243	Forbidden	30 L	1,3	5	40
E	Allyl chloride (*RQ-1000/454*)	3	UN1100	I	FLAMMABLE LIQUID, POISON.	T18, T26	None	201	243	Forbidden	30 L	1,3	5	12, 40
	Allyl chlorocarbonate, see Allyl chloroformate.													
	Allyl chloroformate	8	UN1722	I	CORROSIVE	B4, N1, N34, N41, T18, T26.	None	201	242	Forbidden	2.5 L	1	5	21, 40, 77
	Allyl ethyl ether	3	UN2335	II	FLAMMABLE LIQUID, POISON.	T8	None	202	243	1 L	60 L	1,3	5	12, 40
	Allyl formate	3	UN2336	I	FLAMMABLE LIQUID, POISON.	T18, T26	None	201	243	Forbidden	30 L	1,3	5	12, 40
	Allyl glycidyl ether	3	UN2219	III	FLAMMABLE LIQUID.	B1, T7	150	203	242	60 L	220 L	1,3	1,3	
	Allyl iodide	3	UN1723	I	FLAMMABLE LIQUID, CORROSIVE.	N1, N11, N34, T18.	None	201	243	.5 L	2.5 L	1,3	5	40
	Allyl isothiocyanate, inhibited	6.1	UN1545	II	POISON	N1, N15, N16, N17, N26, T17.	None	202	243	Forbidden	60 L	1	5	21, 25, 40, 95
	Allyltrichlorosilane, stabilized	8	UN1724	II	CORROSIVE	B2, B6, N16, N26, N34, T8, T26.	None	202	242	Forbidden	30 L	1	1	21, 40, 77
	Aluminum alkyl halides	4.2	UN3052	I	SPONTANEOUSLY COMBUSTIBLE.	B11, T28, T29, T40.	None	181	244	Forbidden	Forbidden	1	5	
	Aluminum alkyls	4.2	UN3051	I	SPONTANEOUSLY COMBUSTIBLE.	B11, T28, T29, T40.	None	181	244	Forbidden	Forbidden	1	5	
	Aluminum borohydride *or* Aluminum borohydride in devices.	4.2	UN2870	I	SPONTANEOUSLY COMBUSTIBLE.	B11	None	181	244	Forbidden	Forbidden	1	5	
	Aluminum bromide, anhydrous	8	UN1725	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	40
	Aluminum bromide, solution	8	UN2580	III	CORROSIVE	T8	154	203	241	5 L	60 L	1,2	1,2	
	Aluminum carbide	4.3	UN1394	II	DANGEROUS WHEN WET.	A20, N34, N41.	None	212	242	15 kg	50 kg	1,3	1,3	

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Aluminum chloride, anhydrous	8	UN1726	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	40
	Aluminum chloride, solution	8	UN2581	III	CORROSIVE	T8	154	203	241	5 L	60 L	1,2	1,2	
	Aluminum dross, wet or hot	Forbidden												
	Aluminum ferrosilicon powder	4.3	UN1395	II	DANGEROUS WHEN WET, POISON.	A19	None	212	242	15 kg	50 kg	1,3	1,3	40
	Aluminum hydride	4.3	UN2463	I	DANGEROUS WHEN WET.	A19	None	211	242	Forbidden	15 kg	1,3	5	
	Aluminum nitrate	5.1	UN1438	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,2	1,2	
	Aluminum phosphate solution, see Corrosive liquids, n.o.s.													
	Aluminum phosphide	4.3	UN1397	I	DANGEROUS WHEN WET, POISON.	A19, N2	None	211	242	Forbidden	15 kg	1,3	5	40, 85
	Aluminum phosphide pesticides	6.1	UN3048	I	POISON	N2	None	211	242	Forbidden	15 kg	1,2	1,2	95
	Aluminum powder, coated, *not less than 20 per cent aluminum powder, particle size less than 250 microns.*	4.1	UN1309	II	FLAMMABLE SOLID.		151	212	240	15 kg	50 kg	1,3	1,3	13, 39
	Aluminum powder, uncoated	4.3	UN1396	II	DANGEROUS WHEN WET.	A19, A20	None	212	240	15 kg	50 kg	1,3	1,3	39
	Aluminum resinate	4.1	UN2715	III	FLAMMABLE SOLID.		151	213	240	25 kg	100 kg	1,3	1,3	
	Aluminum silicon powder, uncoated	4.3	UN1398	III	DANGEROUS WHEN WET.	A1, A19	None	213	241	25 kg	100 kg	1,3	1,3	40
DE	Aluminum sulfate, solid (*RQ-5000/2270*)	ORM-E	NA9078	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Aluminum sulfate solution (*RQ-5000/2270*)	8	NA1760	III	CORROSIVE		154	203	241	15 kg	50 kg	1,2	1,2	
	Amatols, see Explosives, blasting, type B													
	2-Amino-4-chlorophenol	6.1	UN2673	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	2-Amino-5-diethylaminopentane	6.1	UN2946	III	KEEP AWAY FROM FOOD.	T1	153	203	240	60 L	220 L	1,2	1,2	34
	2-(2-Aminoethoxy) ethanol	8	UN3055	III	CORROSIVE	T2	154	203	241	5 L	60 L	1,2	1,2	
	N-Aminoethylpiperazine	8	UN2815	III	CORROSIVE	T7	154	203	241	5 L	60 L	1,3	1,3	12
	Aminophenols (*o-,m-,p-*)	6.1	UN2512	III	KEEP AWAY FROM FOOD.	T1	153	213	240	100 kg	200 kg	1,2	1,2	34
	Aminopropyldiethanolamine, see Alkylamines, n.o.s.													
	n-Aminopropylmorpholine, see Alkylamines, n.o.s.													
	Aminopyridines (*o-,m-,p-*)	6.1	UN2671	II	POISON	T7	None	212	242	25 kg	100 kg	1,3	1	12, 40, 95
E	Ammonia, anhydrous, liquefied	2.3	UN1005	III	POISON GAS	10	None	304	314, 315	Forbidden	Forbidden	1,2	5	40, 57
	Ammonia solutions, *density (specific gravity) between 0.880 and 0.957 at 15 degrees C in water, with more than 10 per cent but not more than 35 percent ammonia(RQ-1000/454).*	8	UN2672	III	CORROSIVE	T14	154	203	241	5 L	60 L	1,2	1,2	40, 85

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
E	Ammonia solutions, *density (specific gravity) less than 0.880 at 15 degrees C in water, with more than 50 percent ammonia* (RQ-1000/454.	2.2	UN1005		NONFLAMMABLE GAS.	B13	306	304	314, 315	Forbidden	25 kg	1,3	5	40, 57, 85, 95
E	Ammonia solutions, *density (specific gravity) less than 0.880 at 15 degrees C in water, with more than 35 per cent but not more than 50 per ce t ammonia (RQ-1000/454).*	2.2	UN2073		NONFLAMMABLE GAS.		306	304	314, 315	5 L	60 L	1,3	5	40, 57, 85
DE	Ammonia solutions *with 10 per cent or less ammonia (RQ-1000/454).*	ORM-E	NA2672	III	None		156	203	241	No limit	No limit	1,2	1,2	
DE	Ammonium acetate (*RQ-5000/2270*)	ORM-E	NA9079	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Ammonium arsenate	6.1	UN1546	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	27, 95
	Ammonium azide	Forbidden												
DE	Ammonium benzoate (*RQ-5000/2270*)	ORM-E	NA9080	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Ammonium bicarbonate (*RQ-5000/2270*)	ORM-E	NA9081	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Ammonium bifluoride, solid, see Ammonium hydrogen fluoride, solid.													
	Ammonium bifluoride solution, see Ammonium hydrogen fluoride, solution.													
DE	Ammonium bisulfite, solid solution (*RQ-5000/2270*).	8	NA2693	III	CORROSIVE		154	213	240	5 L	60 L	1,2	1,2	
D	Ammonium bisulfite, solution (*RQ-5000/2270*).	8	NA2693	III	CORROSIVE		154	203	241	5 L	60 L	1,2	1,2	
	Ammonium bromate	Forbidden												
DE	Ammonium carbamate (*RQ-5000/2270*)	ORM-E	NA9083	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Ammonium carbonate (*RQ-5000/2270*)	ORM-E	NA9084	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Ammonium chlorate	Forbidden												
DE	Ammonium chloride (*RQ-5000/2270*)	ORM-E	NA9085	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Ammonium chromate (*RQ-1000/454*)	ORM-E	NA9086	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Ammonium citrate, dibasic (*RQ-5000/2270*).	ORM-E	NA9087	III	None		156	213	240	No limit	No limit	1,2	1,2	
E	Ammonium dichromate (*ammonium bichromate*) (*RQ-1000/454*) solid.	5.1	UN1439	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	34
D	Ammonium dichromate (*ammonium bichromate*) solution (*RQ-1000/454*).	5.1	UN1439	II	OXIDIZER		152	202	241	5 L	60 L	1,2	1,2	
	Ammonium dinitro-o-cresolate	6.1	UN1843	II	POISON	T8	None	212	242	Forbidden	100 kg	1,2	1	36, 65, 66, 77
DE	Ammonium fluoborate (*RQ-5000/2270*)	8	NA9088	III	CORROSIVE		154	213	240	15 kg	50 kg	1,2	1,2	
E	Ammonium fluoride (*RQ-5000/2270*)	6.1	UN2505	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	26, 34
E	Ammonium fluorosilicate (*RQ-1000/454*)	6.1	UN2854	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	26, 34
	Ammonium fulminate	Forbidden												
E	Ammonium hydrogen fluoride, solid (*RQ-5000/2270*).	8	UN1727	II	CORROSIVE	N34	154	212	240	15 kg	50 kg	1,2	1,2	26, 40

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
E	Ammonium hydrogen fluoride, solution (*RQ-5000/2270*).	8	UN2817	II	CORROSIVE, POISON.	N34, T15...	None	202	243	1 L	30 L	1,2	1,2	40
AW	Ammonium hydrogen sulfate	8	UN2506	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	27, 40
	Ammonium hydrosulfide, solution, see Ammonium sulfide solution.													
D	Ammonium hydroxide, *see* Ammonia solutions, *etc.*													
	Ammonium metavanadate	6.1	UN2859	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Ammonium nitrate fertilizers, n.o.s.	5.1	UN2072	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,3	1,3	31, 48, 59, 60
	Ammonium nitrate fertilizers: *uniform non-segregating mixtures of ammonium nitrate/ ammonium sulfate, with more than 45 per cent but not more than 70 per cent ammonium nitrate and not more than 0.4 per cent of total combustible material.*	5.1	UN2069	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,3	1,3	31, 48, 59, 60
	Ammonium nitrate fertilizers: *uniform non-segregating mixtures of ammonium nitrate with added matter which is inorganic and chemically inert towards ammonium nitrite, with not less than 90 per cent ammonium nitrate and not more than 0.2 per cent combustible material (including organic material calculated as carbon), or with more than 70 per cent but less than 90 per cent ammonium nitrate and not more than 0.4 per cent total combustible material.*	5.1	UN2067	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,3	1,3	31, 48, 59, 60
	Ammonium nitrate fertilizers: *uniform non-segregating mixtures of ammonium nitrate with calcium carbonate and/or dolomite, with more than 80 per cent but less than 90 per cent ammonium nitrate and not more than 0.4 per cent total combustible material.*	5.1	UN2068	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,3	1,3	31, 48, 59, 60
	Ammonium nitrate fertilizers: *uniform non-segregating mixtures of nitrogen/phosphate or nitrogen/potash types or complete fertilizers of nitrogen/phosphate/ potash type, with more than 70 per cent but less than 90 per cent ammonium nitrate and not more than 0.4 per cent total combustible material.*	5.1	UN2070	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,3	1,3	31, 48, 59, 60

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
AW	Ammonium nitrate fertilizers: *uniform non-segregating mixtures of nitrogen/phosphate or nitrogen/potash types or complete fertilizers of nitrogen/ phosphate/ potash type, with not more than 70 per cent ammonium nitrate and not more than 0.4 per cent total added combustible material or with not more than 45 per cent ammonium nitrate with unrestricted combustible material.*	9	UN2071	III	None		155	213	240	No limit	No limit	1,2	1,2	
D	Ammonium nitrate fertilizers *with not more than 0.2 percent carbon; which meet the definition in the Fertilizer Institute publication 'Definition and Test Procedures for Ammonium Nitrate Fertilizer', dated May 8, 1971.*	5.1	NA1942	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,3	1,3	31, 48, 60
	Ammonium nitrate fertilizer: *which is more liable to explode than ammonium nitrate with 0.2 per cent combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance.*	1.1D	UN0223											
	Ammonium nitrate, liquid (*hot concentrated solution*).	5.1	UN2426	II	OXIDIZER	B5, B17, T25.	None	None	243	Forbidden	Forbidden	5	5	
	Ammonium nitrate, *with more than 0.2 per cent combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance.*	1.1D	UN0222											
	Ammonium nitrate, *with not more than 0.2 per cent combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance.*	5.1	UN1942	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,3	1,3	31, 48, 59, 60
	Ammonium nitrite	Forbidden												
DE	Ammonium oxalate (*RQ-5000/2270*)	6.1	NA2449	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
	Ammonium perchlorate	5.1	UN1442	II	OXIDIZER	N13, N34	152	212	240	5 kg	25 kg	1,2	5	46
	Ammonium perchlorate, *average particle size less than 45 microns.*	1.1D	UN0402											
	Ammonium permanganate, see Permanganates, inorganic, n.o.s..													
	Ammonium persulfate	5.1	UN1444	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,2	1,2	
	Ammonium picrate, *dry or wetted with less than 10 per cent water, by weight.*	1.1D	UN0004											
	Ammonium picrate, wetted *with not less than 10 per cent water, by weight.*	4.1	UN1310	I	FLAMMABLE SOLID.	A2, N15, N34, N41.	None	211	None	0.5 kg	0.5 kg	1	5	36

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Ammonium polysulfide, solution	8	UN2818	II	CORROSIVE, POISON.	T14	None	202	243	1 L	30 L	1,3	1	12, 26, 40
	Ammonium polyvanadate	6.1	UN2861	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Ammonium silicofluoride, see Ammonium fluorosilicate.													
DE	Ammonium sulfamate (*RQ-5000/2270*)	ORM-E	NA9089	III	None		156	213	240	No limit	No limit	1,2	1,2	
E	Ammonium sulfide solution (*RQ-5000/2270*).	8	UN2683	II	CORROSIVE, POISON, FLAMMABLE LIQUID.	T14	None	202	243	1 L	30 L	1,3	1	12, 22, 49
DE	Ammonium sulfite (*RQ-5000/2270*)	ORM-E	NA9090	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Ammonium tartrate (*RQ-5000/2270*)	ORM-E	NA9091	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Ammonium thiocyanate (*RQ-5000/2270*)	ORM-E	NA9092	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Ammonium thiosulfate (*RQ-5000/2270*)	ORM-E	NA9093	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Ammunition, blank, see Cartridges for weapons, blank.													
	Ammunition, illuminating *with or without burster, expelling charge or propelling charge.*	1.2G	UN0171											
	Ammunition, illuminating *with or without burster, expelling charge or propelling charge.*	1.3G	UN0254											
	Ammunition, illuminating *with or without burster, expelling charge or propelling charge.*	1.4G	UN0297											
	Ammunition, incendiary *liquid or gel, with burster, expelling charge or propelling charge.*	1.3J	UN0247											
	Ammunition, incendiary (*other than water-activated ammunition*), *without white phosphorus or phosphides, with or without burster, expelling charge or propelling charge.*	1.2G	UN0009											
	Ammunition, incendiary (*other than water-activated ammunition*), *without white phosphorus or phosphides, with or without burster, expelling charge or propelling charge.*	1.3G	UN0010											
	Ammunition, incendiary (*other than water-activated ammunition*), *without white phosphorus or phosphides, with or without burster, expelling charge or propelling charge.*	1.4G	UN0300											
	Ammunition, incendiary (water-activated contrivances) with burster, expelling charge or propelling charge, see Contrivances, water-activated, etc..													
	Ammunition, incendiary, white phosphorus, *with burster, expelling charge or propelling charge.*	1.2H	UN0243											

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Ammunition, incendiary, white phosphorus, *with burster, expelling charge or propelling charge.*	1.3H	UN0244											
	Ammunition, practice	1.4G	UN0362											
	Ammunition, proof	1.4G	UN0363											
	Ammunition, rocket, see Warheads, rocket *etc.*.													
	Ammunition, SA (small arms), see Cartridges for weapons, *etc.*.													
	Ammunition, smoke (*other than water-activated ammunition*), *without white phosphorus or phosphides, with or without burster, expelling charge or propelling charge.*	1.3G	UN0016											
	Ammunition, smoke (*other than water-activated ammunition*), *without white phosphorus or phosphides, with or without burster, expelling charge or propelling charge.*	1.4G	UN0303											
	Ammunition, smoke (*other than water-activated ammunition*), *without white phosphorus or phosphides with or without bursier, expelling charge or propelling charge.*	1.2G	UN0015											
	Ammunition, smoke (water-activated contrivances), white phosphorus, with burster, expelling charge or propelling charge, see Contrivances, water-activated, *etc. (UN 0248).*													
	Ammunition, smoke (water-activated contrivances), without white phosphorus or phosphides, with burster, expelling charge or propelling charge, see Contrivances, water-activated, *etc. (UN 0249).*													
	Ammunition, smoke, white phosphorus (*other than water-activated ammunition*), *with burster, expelling charge or propelling charge.*	1.3H	UN0246											
	Ammunition smoke, white phosphorus (*other than water-activated ammunition*), *with burster, expelling charge or propelling charge.*	1.2H	UN0245											
	Ammunition, sporting, see Cartridges for weapons, *etc. (UN 0012; 0328; 0339).*													
	Ammunition, tear-producing, non-explosive, *without burster or expelling charge, non-fuzed.*	6.1	UN2017	II	POISON, CORROSIVE.		None	212	None	Forbidden	50 kg	1,2	5	13, 20, 40, 95
	Ammunition, tear-producing *with burster, expelling charge or propelling charge.*	1.2G	UN0018											

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Antimony pentafluoride	8	UN1732	II	CORROSIVE, POISON.	N1, N3, N11, N16, N26, N35, T12, T26.	None	202	243	Forbidden	30 L	1	5	40
E	Antimony potassium tartrate (*RQ-1000/454*).	6.1	UN1551	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Antimony powder	6.1	UN2871	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Antimony sulfide and a chlorate, mixtures of.	Forbidden												
	Antimony sulfide, solid, see Antimony compounds, inorganic, n.o.s.													
DE	Antimony tribromide, solid (*RQ-1000/454*)	8	NA1549	II	CORROSIVE		154	212	240	25 kg	100 kg	1,2	1,2	
D	Antimony tribromide, solution (*RQ-1000/454*).	8	NA1549	II	CORROSIVE	B2	154	202	242	1 L	30 L	1	1	
E	Antimony trichloride , solid (*RQ-1000/454*)	8	UN1733	II	CORROSIVE		154	212	240	25 kg	100 kg	1,2	1,2	40
DE	Antimony trichloride solution (*RQ-1000/454*).	8	NA1549	II	CORROSIVE	B2	154	202	242	1 L	30 L	1	1	
DE	Antimony trifluoride, solid (*RQ-1000/454*)	8	NA1549	II	CORROSIVE		154	212	240	25 kg	25 kg	1,2	1,2	
DE	Antimony trifluoride solution (*RQ-1000/454*).	8	NA1549	II	CORROSIVE	B2	154	202	242	1 L	30 L	1	1	
DE	Antimony trioxide (*RQ-5000/2270*)	ORM-E	NA9201	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Aqua ammonia, see Ammonia solution, *etc.*													
	Argon, compressed	2.2	UN1006		NONFLAMMABLE GAS.		306	302	314, 315	75 kg	150 kg	1,3	1,3	85
	Argon, refrigerated liquid (*cryogenic liquid*)	2.2	UN1951		NONFLAMMABLE GAS.		320	316	318	50 kg	500 kg	1,3	1	85
	Arsenic acid, liquid	6.1	UN1553	I	POISON	T18, T27	None	201	243	1 L	30 L	1,2	1,2	95
	Arsenic acid, solid	6.1	UN1554	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Arsenical dust	6.1	UN1562	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Arsenical pesticides, liquid, flammable, toxic, n.o.s., *flash point less than 23 degrees C.*	3	UN2760	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	5	
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	
	Arsenical pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23 degrees C.*	6.1	UN2993	I	POISON, FLAMMABLE LIQUID.	T42	None	201	243	1 L	30 L	1	1	21, 95
				II	POISON, FLAMMABLE LIQUID.	T14	None	202	243	5 L	60 L	1,2	1	21, 95
				III	KEEP AWAY FROM FOOD.	B1, T14	153	203	241	60 L	220 L	1,2	1,2	21, 34
	Arsenical pesticides, liquid, toxic, n.o.s.	6.1	UN2994	I	POISON	T42	None	201	243	1 L	30 L	1	1	95
				II	POISON	T14	None	202	243	5 L	60 L	1,2	1	95

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Barium	4.3	UN1400	II	DANGEROUS WHEN WET.	A19	None	212	241	15 kg	50 kg	1,3	5	
	Barium alloys, pyrophoric	4.2	UN1854	II	SPONTANEOUSLY COMBUSTIBLE.		None	181	None	Forbidden	Forbidden	1	5	
	Barium azide, *dry or wetted with less than 50 per cent water, by weight.*	1.1A	UN0224											
	Barium azide, wetted *with not less than 50 per cent water, by weight.*	4.1	UN1571	I	FLAMMABLE SOLID, POISON.	A2	None	182	None	Forbidden	Forbidden	1	5	36
	Barium bromate	5.1	UN2719	II	OXIDIZER, POISON.		None	212	242	5 kg	25 kg	1,2	1,2	34, 46, 56
	Barium chlorate	5.1	UN1445	II	OXIDIZER, POISON.	N13, N34, T8.	None	212	242	5 kg	25 kg	1,2	1,2	46, 56, 95
	Barium compounds, n.o.s., *except Barium sulfate.*	6.1	UN1564	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
E	Barium cyanide (*RQ-10/4.54*)	6.1	UN1565	I	POISON	N74, N75	None	211	242	5 kg	50 kg	1,2	1,2	26, 40, 95
	Barium hypochlorite *with more than 22 per cent available chlorine.*	5.1	UN274	II	OXIDIZER	N13, N26, N34.	152	212	None	5 kg	25 kg	1,2	1,2	34
	Barium nitrate	5.1	UN1446	II	OXIDIZER, POISON.		None	212	242	5 kg	25 kg	1,2	1,2	95
	Barium oxide	6.1	UN1884	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Barium perchlorate	5.1	UN1447	II	OXIDIZER, POISON.	T8	None	212	242	5 kg	25 kg	1,2	1,2	46, 95
					Poison									
	Barium permanganate	5.1	UN1448	II	OXIDIZER, POISON.		None	212	242	5 kg	25 kg	1,2	1,2	56, 69, 95
	Barium peroxide	5.1	UN1449	II	OXIDIZER, POISON.		None	212	2	5 kg	25 kg	1,2	1,2	13, 95
	Barium selenate, *see* Selenates *or* Selenites.													
	Barium selenite, *see* Selenates *or* Selenites.													
AW	Batteries, dry, containing potassium hydroxide solid, *electric, storage.*	8	UN3028	III	CORROSIVE		159	159	None	25 kg gross.	25 kg gross.	1,2	1,2	
	Batteries, wet, filled with acid, *electric storage.*	8	UN2794	II	CORROSIVE		159	159	None	25 kg gross.	230 kg gross.	1,2	1,2	
	Batteries, wet, filled with alkali, *electric storage.*	8	UN2795	III	CORROSIVE		159	159	None	25 kg gross.	230 kg gross.	1,2	1,2	
AW	Batteries, wet, non-spillable, *electric storage.*	8	UN2800	III	CORROSIVE		159	159	None	No Limit	No Limit	1,2	1,2	

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	202	241	60 L	220 L	1,3	1,3	
	Butyl alcohols, see Butanols													
E	n-Butylamine *(RQ 1000/454)*	3	UN1125	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	40
	N-Butylaniline	6.1	UN2738	II	POISON	T8	None	202	243	5 L	60 L	1,2	1,2	40, 95
	Butyl benzenes	3	UN2709	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	n-Butyl bromide	3	UN1126	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	n-Butyl chloride, see Chlorobutanes													
	sec-Butylchloroformate	6.1	NA2743	I	POISON, CORROSIVE.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,3	1,3	12, 40, 95
	n-Butylchloroformate	6.1	UN2743	I	POISON, CORROSIVE.	T18	None	201	243	Forbidden	1 L	1,3	1,3	12, 13, 21, 25, 40, 95
	tert-Butyl cumyl peroxide, *technically pure*	5.2	UN2091	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	tert-Butylcyclohexylchloroformate	6.1	UN2747	III	KEEP AWAY FROM FOOD.	T8	153	203	241	60 L	220 L	1,3	1,3	12, 13, 25, 34
	n-Butyl-4,4-di-(tertbutylperoxy) valerate, *not more than 52 per cent with inert solid.*	5.2	UN2141	II	ORGANIC PEROXIDE.		None	225	None	5 kg	10 kg	1	5	12, 40
	n-Butyl-4,4-di-(tertbutylperoxy) valerate, *technically pure.*	5.2	UN2140	II	ORGANIC PEROXIDE.		152	225	None	5 L	5 L	1	5	12, 40
	Butylene	2.1	UN1012		FLAMMABLE GAS.		None	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	1,2-Butylene oxide, stabilized	3	UN3022	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Butyl ethers, see Dibutyl ethers													
	Butyl ethyl ether, see Ethyl butyl ether													
	n-Butyl formate	3	UN1128	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	tert-Butyl hydroperoxide, more than 90 per cent with water.	Forbidden												
	tert-Butyl hydroperoxide, *more than 72 per cent but not more than 90 per cent with water.*	5.2	UN2094	I	ORGANIC PEROXIDE.		None	225	None	1 L	5 L	1	5	12, 40
	tert-Butyl hydroperoxide, *not more than 72 per cent with water.*	5.2	UN2093	I	ORGANIC PEROXIDE.	T9, T37	None	225	None	1 L	5 L	1	5	12, 40
	tert-Butyl hydroproxide, *not more than 80 per cent in di-tert-butyl peroxide, or* tert-Butyl hydroperoxide, *not more than 80 per cent in di-tert-butyl peroxide and solvent or* tert-Butyl hydroperoxide, *not more than 80 per cent in solvent.*	5.2	UN2092	I	ORGANIC PEROXIDE, FLAMMABLE LIQUID.		None	225	None	1 L	5 L	1	5	12, 40
	N,n-Butyl imidazole	6.1	UN2690	II	POISON	T8	None	202	243	5 L	60 L	1,2	1,2	40, 95
	tert-Butyl isocyanate	3	UN2484	I	FLAMMABLE LIQUID, POISON.	B14, B32, N26, 10.	None	227	244	Forbidden	Forbidden	1	5	12, 40, 48

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	n-Butyl isocyanate	3	UN2485	I	FLAMMABLE LIQUID, POISON.	B14, B32, N26, 10.	None	227	244	Forbidden	Forbidden	1	5	12, 40, 48
	Butyl mercaptan	3	UN2347	II	FLAMMABLE LIQUID.	N1, N15, T8.	150	202	242	5 L	60 L	1,3	1	
	-Butyl methacrylate	3	UN2227	II	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Butyl methyl ether	3	UN2350	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	tert-Butyl monoperoxymaleate, *not more than 55 per cent as a paste.*	5.2	UN2101	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	tert-Butyl monoperoxymaleate, *not more than 55 per cent in solution.*	5.2	UN2100	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	tert-Butyl monoperoxymaleate, *technically pure.*	5.2	UN2099	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	tert-Butyl monoperoxyphthalate, *technically pure.*	5.2	UN2105	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	Butyl nitrite	3	UN2351	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	40
				III	FLAMMABLE LIQUID.	T8	150	202	241	60 L	220 L	1,3	1,3	40
	tert-Butyl peroxyacetate, more than 76 per cent in solution.	Forbidden												
	tert-Butyl peroxyacetate, *not more than 76 per cent in solution.*	5.2	UN2095	II	ORGANIC PEROXIDE.		152	225	None	Forbidden	Forbidden	1	5	12, 40
	tert-Butyl peroxyacetate, *not more than 52 per cent in solution.*	5.2	UN2096	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	tert-Butyl peroxybenzoate, *not more than 50 per cent with inert inorganic solid.*	5.2	UN2890	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	tert-Butyl peroxybenzoate, *not more than 75 per cent in solution.*	5.2	UN2098	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	tert-Butyl peroxybenzoate, *technically pure or* tert-Butyl peroxybenzoate, *more than 75 per cent in solution.*	5.2	UN2097	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	tert-Butyl peroxycrotonate, *not more than 76 per cent in solution.*	5.2	UN2183	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	n-Butyl peroxydicarbonate, see Di-n-butyl peroxidicarbonate, *etc.*.													
	tert-Butyl peroxydiethylacetate, *not more than 33 per cent,* with tert-Butyl peroxybenzoate, *not more than 33 per cent, and solvent.*	5.2	UN2551	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	tert-Butyl peroxydiethylacetate, *technically pure.*	5.2	UN2144	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	tert-Butyl peroxy-2-ethylhexanoate, *not more than 30 per cent* with 2,2-Di(tert-butyl-peroxy) butane, *not more than 35 per cent, with not less than 35 per cent phlegmatizer.*	5.2	UN2886	II	ORGANIC PEROXIDE.		152	225	None	Forbidden	Forbidden	1	5	20, 40

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***) Exceptions	Non-bulk packaging	Bulk packaging	(9) Quantity limitations Passenger aircraft or railcar	Cargo aircraft only	(10) Vessel stowage requirements Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	tert-Butyl peroxy-2-ethylhexanoate, *not more than 50 per cent with phlegmatizer.*	5.2	UN2868	II	ORGANIC PEROXIDE.		152	225	None	Forbidden	Forbidden	1	5	20, 40
	tert-Butyl peroxy-2-ethylhexanoate, *not more than 12 per cent* with 2,2-Di-(tert-butyl-peroxy) butane, *not more than 14 per cent, with not less than 14 per cent phlegmatizer and 60 per cent inert organic solid.*	5.2	UN2887	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	tert-Butyl peroxy-2-ethylhexanoate, *technically pure.*	5.2	UN2143	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	tert-Butyl peroxyisobutyrate, *more than 52 per cent but not more than 77 per cent in solution.*	5.2	UN2142	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	tert-Butyl peroxyisobutyrate, more than 77 per cent in solution.	Forbidden												
	tert-Butyl peroxyisobutyrate, *not more than 52 per cent in solution.*	5.2	UN2562	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	tert-Butylperoxy isopropyl carbonate, *technically pure.*	5.2	UN2103	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	tert-Butyl peroxyneodecanoate, *not more than 77 per cent in solution.*	5.2	UN2177	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	tert-Butyl peroxyneodecanoate, *technically pure.*	5.2	UN2594	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	3-tert-Butylperoxy-3-phenylphthalide, *technically pure.*	5.2	UN2596	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	tert-Butyl peroxypivalate, *not more than 77 per cent in solution.*	5.2	UN2110	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	tert-Butyl peroxypivalate, *not more than 72 per cent in solution.*	5.2	UN3047	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	tert-Butylperoxy stearyl carbonate, *technically pure.*	5.2	UN3062	II	ORGANIC PEROXIDE.		None	255	None	Forbidden	Forbidden	1	5	
	tert-Butyl peroxy-3,5,5-trimethylhexanoate, *technically pure.*	5.2	UN2104	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	Butylphenols, liquid	6.1	UN2228	III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	1,2	34
	Butylphenols, solid	6.1	UN2229	III	KEEP AWAY FROM FOOD.	T7, T38	153	213	240	100 kg	200 kg	1,2	1,2	34
	Butyl phosphoric acid, see Butyl acid phosphate.													
DE	n-Butyl phthalate (*RQ-100/45.4*)	ORM-E	NA9095	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Butylpropionate	3	UN1914	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Butyl toluenes	6.1	UN2667	III	KEEP AWAY FROM FOOD.	T2	153	203	241	60 L	220 L	1,2	1,2	22, 25, 34
	Butyltrichlorosilane	8	UN1747	II	CORROSIVE	B2, B6, N16, N26, N34, T8, T26.	None	202	242	Forbidden	30 L	1	1	21, 40, 77

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	5-tert-Butyl-2,4,6-trinitro-m-xylene (Musk xylene).	4.1	UN2956	III	FLAMMABLE SOLID.		None	214	None	Forbidden	Forbidden	1	5	12, 25, 48
	Butyl vinyl ether, inhibited	3	UN2352	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	40
	1,4-Butynediol	4.1	UN2716	III	FLAMMABLE SOLID.	A1	None	213	240	25 kg	100 kg	1,2	1	52, 53, 67, 70
	Butyraldehyde	3	UN1129	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Butyraldoxime	3	UN2840	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
E	Butyric acid (*RQ-5000/2270*)	8	UN2820	III	CORROSIVE	T1	154	203	241	5 L	60 L	1,3	1,3	12
	Butyric anhydride	8	UN2739	III	CORROSIVE	T2	154	203	241	5 L	60 L	1,2	1,2	
	Butyronitrile	3	UN2411	II	FLAMMABLE LIQUID, POISON.	T14	None	202	243	1 L	60 L	1,3	5	12, 40
	Butyryl chloride	3	UN2353	II	FLAMMABLE LIQUID, CORROSIVE.	T9, T26	None	202	243	1 L	5 L	1	1	13, 25, 40
	Cabazide	Forbidden												
	Cacodylic acid	6.1	UN1572	II	POISON		None	212	242	25 kg	100 kg	1,2	5	26, 95
DE	Cadmium acetate (*RQ-100/45.4*)	6.1	NA2570	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
DE	Cadmium bromide (*RQ-100/45.4*)	6.1	NA2570	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
DE	Cadmium chloride (*RQ-100/45.4*)	6.1	NA2570	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34, 40
	Cadmium compounds, *except Cadmium selenide and Cadmium sulfide.*	6.1	UN2570	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Calcium	4.3	UN1401	II	DANGEROUS WHEN WET.		None	212	241	15 kg	50 kg	1,3	5	
E	Calcium arsenate (*RQ-1000/454*)	6.1	UN1573	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
E	Calcium arsenate and calcium arsenite, mixtures, solid (*RQ-1000/454*).	6.1	UN1574	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
DE	Calcium arsenite, solid (*RQ-1000/454*)	6.1	NA1574	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Calcium bisulfite solution, see Bisulfites, inorganic, aqueous solutions, n.o.s..													
E	Calcium carbide (*RQ-5000/2270*)	4.3	UN1402	II	DANGEROUS WHEN WET.	A19, N2, N34.	None	212	241	15 kg	50 kg	1,3	1,3	32
	Calcium chlorate	5.1	UN1452	II	OXIDIZER	B10, N16, N34.	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
	Calcium chlorate solution	5.1	UN2429	II	OXIDIZER	A2, N34, N41, T8.	152	202	242	1 L	5 L	1,2	1	46, 56
	Calcium chlorite	5.1	UN1453	II	OXIDIZER	B10, N13, N34.	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
DE	Calcium chromate (*RQ-1000/454*)	ORM-E	NA9096	III	None		156	213	240	No limit	No limit	1,2	1,2	

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Calcium cyanamide *with more than 0.1 per cent of calcium carbide.*	4.3	UN1403	III	DANGEROUS WHEN WET.	A1, A19	None	213	241	25 kg	100 kg	1,3	1,3	
E	Calcium cyanide (*RQ-10/4.54*)	6.1	UN1575	I	POISON	N79, N80	None	211	242	5 kg	50 kg	1,2	1,2	26, 40, 95
	Calcium dithionite *or* Calcium hydrosulfite	4.2	UN1923	II	SPONTANEOUSLY COMBUSTIBLE.	A19, A20	None	212	241	15 kg	50 kg	1,3	5	13
DE	Calcium dodecylbenzenesulfonate (*RQ-1000/454*).	ORM-E	NA9097	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Calcium hydride	4.3	UN1404	I	DANGEROUS WHEN WET.	A19	None	211	242	Forbidden	15 kg	1,3	5	
	Calcium hydrosulfite, *see* Calcium dithionite.													
E	Calcium hypochlorite, dry *or* Calcium hypochlorite mixtures *with more than 39 per cent available chlorine (8.8 per cent available oxygen)* (*RQ-100/45.4*).	5.1	UN1748	II	OXIDIZER	N13, N26, N34.	152	212	None	5 kg	25 kg	1,3	5	48, 56
E	Calcium hypochlorite, hydrated *or* Calcium hypochlorite, hydrated mixtures, *with not less than 5.5 per cent but not more than 10 per cent water* (*RQ-100/45.4*).	5.1	UN2880	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	50
	Calcium hypochlorite mixtures, dry, *with more than 10 per cent but not more than 39 per cent available chlorine.*	5.1	UN2208	III	OXIDIZER	A1, A29, N34.	152	213	240	25 kg	100 kg	1,2	1,2	
	Calcium manganese silicon	4.3	UN2844	III	DANGEROUS WHEN WET.	A1, A19	None	213	241	25 kg	100 kg	1,3	1,3	
	Calcium nitrate	5.1	UN1454	III	OXIDIZER	T2	152	213	240	25 kg	100 kg	1,2	1,2	
	Calcium oxide	8	UN1910	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
	Calcium perchlorate	5.1	UN1455	II	OXIDIZER	B10, T8	152	212	240	5 kg	25 kg	1,2	1,2	46
	Calcium permanganate	5.1	UN1456	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	56, 69
	Calcium peroxide	5.1	UN1457	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	13
	Calcium phosphide	4.3	UN1360	I	DANGEROUS WHEN WET.	A19, N2	None	211	242	Forbidden	15 kg	1,2	5	40, 85
	Calcium, pyrophoric *or* Calcium alloys, pyrophoric.	4.2	UN1855	II	SPONTANEOUSLY COMBUSTIBLE.		None	187	None	Forbidden	Forbidden	1	5	
	Calcium resinate	4.1	UN1313	III	FLAMMABLE SOLID.	A1, A19		213	240	25 kg	100 kg	1,3	1,3	
	Calcium resinate, fused	4.1	UN1314	III	FLAMMABLE SOLID.	A1, A19		213	240	25 kg	100 kg	1,3	1,3	
	Calcium selenate, *see* Selenates *or* selenites.													
	Calcium silicide	4.3	UN1405	II	DANGEROUS WHEN WET.	A19	None	212	241	15 kg	50 kg	1,3	1,3	
	Calcium silicon	4.3	UN1406	III	DANGEROUS WHEN WET.	A1, A19	None	213	241	25 kg	100 kg	1,3	1,3	
	Camphor oil	3	UN1130	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Camphor, *synthetic*	4.1	UN2717	III	FLAMMABLE SOLID.	A1		213	240	25 kg	100 kg	1,3	1,3	
	Cannon primers, see Primers, tubular													
	Caproic acid	8	UN2829	III	CORROSIVE	T1	154	203	241	5 L	60 L	1,2	1,2	
	Capryloyl peroxide, see n-Octanoyl peroxide.													
	Caps, blasting, see Detonators, *etc.*													
	Caps, toy (*Amorces*)	1.4S												
DE	Captan (*RQ-10/4.54*)	ORM-E	NA9099	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Carbamate pesticides, liquid, flammable, toxic, n.o.s., *flash point less than 23 degrees C.*	3	UN2758	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	5	
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	
	Carbamate pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23 degrees C.*	6.1	UN2991	I	POISON, FLAMMABLE LIQUID.	T42	None	201	243	1 L	30 L	1	1	21, 40, 95
				II	POISON, FLAMMABLE LIQUID.	T14	None	202	243	5 L	60 L	1,2	1	21, 40, 95
				III	KEEP AWAY FROM FOOD.	B1, T14	153	203	242	60 L	220 L	1,2	1,2	21, 34, 40
	Carbamate pesticides, liquid, toxic, n.o.s.	6.1	UN2992	I	POISON	T42	None	201	243	1 L	30 L	1	1	40, 95
				II	POISON	T14	None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Carbamate pesticides, solid, toxic, n.o.s.	6.1	UN2757	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	40, 95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34, 40
ADE	Carbaryl (*RQ-100/45.4*)	6.1	NA2757	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
DE	Carbofuran (*RQ-10/4.54*)	6.1	NA2757	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	
	Carbolic acid, see Phenol, solid *or* Phenol, molten.													
	Carbolic acid solutions, see Phenol solutions.													
I	Carbon, activated	4.2	UN1362	III	SPONTANEOUSLY COMBUSTIBLE.		None	213	241	Forbidden	Forbidden	1,3	1,3	12
I	Carbon, *animal or vegetable origin*	4.2	UN1361	III	SPONTANEOUSLY COMBUSTIBLE.		None	213	241	Forbidden	Forbidden	1,3	1,3	12
	Carbon bisulfide, see Carbon disulfide													
	Carbon dioxide	2.2	UN1013		NONFLAMMABLE GAS.	B13	306	302, 304	244	75 kg	150 kg	1,3	1,3	85

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Carbon dioxide and ethylene oxide mixtures *with more than 6 per cent ethylene oxide.*	2.3	UN1041	III	POISON GAS, FLAMMABLE GAS.	B13, B14, B33, 10.	306	304	244	Forbidden	Forbidden	1,3	1	40, 85, 95
	Carbon dioxide and ethylene oxide mixtures *with not more than 6 per cent ethylene oxide.*	2.2	UN1952		NONFLAMMABLE GAS.	B13	None	304	244	75 kg	150 kg	1,3	1	85
	Carbon dioxide and nitrous oxide mixtures	2.2	UN1015		NONFLAMMABLE GAS.	B13	306	304	244	75 kg	150 kg	1,3	1,3	85
	Carbon dioxide and oxygen mixtures	2.2	UN1014		NONFLAMMABLE GAS.	B13	306	304	244	Forbidden	Forbidden	1,3	1,3	85
	Carbon dioxide, refrigerated liquid	2.2	UN2187		NONFLAMMABLE GAS.		306	None	314, 315	50 kg	500 kg	1,3	1,3	85
AW	Carbon dioxide, solid (Dry ice)	9	UN1845	III	None	B12	217	217	240	200 kg	200 kg	1	1	40
E	Carbon disulfide (*RQ-5000/2270*)	3	UN1131	I	FLAMMABLE LIQUID, POISON.	B16, T18, T26, T29.	None	201	243	Forbidden	Forbidden	1	5	12, 18, 40
	Carbon monoxide	2.3	UN1016	III	POISON GAS, FLAMMABLE GAS.	B13, B14, B33, 10.	None	302	244	Forbidden	Forbidden	1	5	40, 95
	Carbon monoxide and hydrogen mixture	2.3	UN2600	III	POISON GAS, FLAMMABLE GAS.	B13, B14, B33, 10.	None	302	244	Forbidden	Forbidden	1	5	40, 95
D	Carbon monoxide, cryogenic liquid	2.3	NA9202	III	POISON GAS, FLAMMABLE GAS.	10	None	316	318	Forbidden	Forbidden	1	5	
I	Carbon remover, liquid	3	UN1132	II	FLAMMABLE LIQUID.		150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.		150	203	242	60 L	220 L	1,3	1,3	
	Carbon tetrabromide	6.1	UN2516	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	25, 34
AEW	Carbon tetrachloride (*RQ-5000/2270*)	6.1	UN1846	II	POISON	N36, T8	None	202	243	5 L	60 L	1,2	1,2	40, 95
	Carbonyl chloride, see Phosgene													
	Carbonyl fluoride	2.3	UN2417	IB	POISON GAS	B13, B14, B31, 10.	None	302	244	Forbidden	Forbidden	1	5	40, 95
	Carbonyl sulfide	2.3	UN2204	II	POISON GAS, FLAMMABLE GAS.	B13, B14, B31, 10.	None	304	244	Forbidden	Forbidden	1	5	40, 95
	Cartridge cases, empty primed, see Cases, cartridge, empty, with primer.													
	Cartridges, actuating, for aircraft ejector seat catapult, fire extinguisher, canopy removal or apparatus, see Cartridges, power device.													
	Cartridges, explosive, see Charges, demolition.													
	Cartridges, flash	1.1G	UN0049											
	Cartridges, flash	1.3G	UN0050											
	Cartridges for weapons, blank	1.1C	UN0326											
	Cartridges for weapons, blank	1.3C	UN0327											

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Cartridges for weapons, blank	1.4C	UN0338											
	Cartridges for weapons, blank	1.2C	UN0413											
	Cartridges for weapons, blank (Cartridges, safety, blank).	1.4S	UN0014											
	Cartridges for weapons (Cartridges, safety), *other than blank.*	1.4S	UN0012											
	Cartridges for weapons, inert projectile	1.2C	UN0328											
	Cartridges for weapons, inert projectile	1.4C	UN0339											
	Cartridges for weapons, inert projectile	1.3C	UN0417											
	Cartridges for weapons, *with bursting charge.*	1.1F	UN0005											
	Cartridges for weapons, *with bursting charge.*	1.2F	UN0007											
	Cartridges for weapons, *with bursting charge.*	1.4F	UN0348											
	Cartridges for weapons, *with bursting charge.*	1.4E	UN0412											
	Cartridges for weapons, *with bursting charge (projectiles with propelling charge).*	1.1E	UN0006											
	Cartridges for weapons, *with bursting charge (projectiles with propelling charge).*	1.2E	UN0321											
	Cartridges, oil well	1.3C	UN0277											
	Cartridges, oil well	1.4C	UN0278											
	Cartridges, power device	1.3C	UN0275											
	Cartridges, power device	1.4C	UN0276											
	Cartridges, power device	1.2C	UN0381											
	Cartridges, power device (Cartridges, safety).	1.4S	UN0323											
	Cartridges, safety, *see* Cartridges for weapons, *other than blank or* Cartridges, power device (*UN 0323*).													
	Cartridges, safety, blank, *see* Cartridges for weapons, blank (*UN 0014*).													
	Cartridges, signal	1.3G	UN0054											
	Cartridges, signal	1.4G	UN0312											
	Cartridges, signal	1.4S	UN0405											
	Cartridges, sporting, see Cartridges for weapons, *other than blank.*													
	Cartridges, starter, jet engine, see Cartridges, power device.													
	Cases, cartridge, empty with primer	1.4S	UN0055											
	Cases, cartridges, empty with primer	1.4C	UN0379											
	Casinghead gasoline see Natural gasoline													
AW	Castor beans *or* Castor meal *or* Castor pomace *or* Castor flake.	9	UN2969	II	None		155	204	240	No limit	No limit	1,2	5	34, 40, 44
	Caustic alkali liquids, n.o.s.	8	UN1719	II	CORROSIVE	B2, T14	154	202	242	1 L	30 L	1,2	1,2	
	Caustic potash, see Potassium hydroxide *etc.*.													

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Caustic soda, (etc.) see Sodium hydroxide *etc.*.													
	Celluloid, *in blocks, rods, rolls, sheets, tubes, etc. (except scrap).*	4.1	UN2000	III	FLAMMABLE SOLID.		None	213	240	25 kg	100 kg	1,3	1,3	
	Celluloid, scrap	4.2	UN2002	III	SPONTANEOUSLY COMBUSTIBLE.		None	213	241	Forbidden	Forbidden	1	5	
	Cement, see Adhesives *containing flammable liquid.*													
	Cerium, crude	4.1	UN1333	II	FLAMMABLE SOLID.	N34	None	212	240	15 kg	50 kg	1,3	5	65, 74
	Cerium, crude, *compact form*	4.1	UN1333	III	FLAMMABLE SOLID.	A1	None	213	240	25 kg	100 kg	1,3	1,3	65, 74
	Cesium	4.3	UN1407	I	DANGEROUS WHEN WET.	A19, A22, N34.	None	211	242	Forbidden	15 kg	1	5	
	Cesium hydroxide	8	UN2682	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	
	Cesium hydroxide solution	8	UN2681	II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1,2	1,2	
	Cesium nitrate	5.1	UN1451	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,2	1,2	
D	Charcoal *briquettes, shell, screenings, wood, etc.*.	4.2	NA1361	III	FLAMMABLE SOLID.	B10	151	213	240	25 kg	100 kg	1,3	1,3	
D	Charged well casing jet perforating gun (*total explosive contents in guns 20 pounds or more per motor vehicle*).	1.1D	NA0059											
D	Charged well casing jet perforating gun (*total explosive contents in guns not exceeding 20 pounds per motor vehicle or special offshore down hole tool pallet*).	1.4D	NA0440											
	Charges, demolition	1.1D	UN0048											
	Charges, depth	1.1D	UN0056											
	Charges, expelling, explosive, for fire extinguishers, see Cartridges, power device.													
	Charges, explosive, commercial *without detonator.*	1.1D	UN0442											
	Charges, explosive, commercial *without detonator.*	1.2D	UN0443											
	Charges, explosive, commercial *without detonator.*	1.4D	UN0444											
	Charges, explosive, commercial *without detonator.*	1.4S	UN0445											
	Charges, propelling for cannon	1.2C	UN0414											
	Charges, propelling, for cannon	1.3C	UN0242											
	Charges, propelling, for cannon	1.1C	UN0279											
	Charges, propelling, for rocket motors	1.1C	UN0271											
	Charges, propelling, for rocket motors	1.3C	UN0272											
	Charges, propelling, for rocket motors	1.2C	UN0415											
	Charges, propelling, for rocket motors, *composite mixture.*	1.1C	UN0273											
	Charges, propelling, for rocket motors, *composite mixture.*	1.3C	UN0274											

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Charges, propelling, for rocket motors, *composite mixture.*	1.2C	UN0416											
	Charges, shaped, commercial *without detonator.*	1.2D	UN0439											
	Charges, shaped, commercial *without detonator.*	1.4D	UN0440											
	Charges, shaped, commercial *without detonator.*	1.4S	UN0441											
	Charges, shaped, commercial *without detonator.*	1.2D	UN0439											
	Charges, shaped, commercial, *without detonator.*	1.1D	UN0059											
	Charges, shaped, flexible, linear, *metal clad.*	1.4D	UN0237											
	Charges, shaped, flexible, linear, *metal clad.*	1.1D	UN0288											
	Charges, supplementary explosive	1.1D	UN0060											
D	Chemical kit	8	NA1760	II	CORROSIVE		154	161	None	1 L	1 L	1,3	1,3	
	Chemical kits (*must be classified and labelled according to the hazard class of the constituent(s)*).													
	Chloracetophenone (*CN*) *Solid*	6.1	UN1697	II	POISON	N1, N12, N16, N17, N32, N33, N34.	None	212	242	Forbidden	100 kg	1	5	12, 40, 95
	Chloral, anhydrous, inhibited	6.1	UN2075	II	POISON	T14	None	212	243	25 kg	100 kg	1	5	40, 95
	Chlorate and borate mixtures	5.1	UN1458	II	OXIDIZER	B10, N13, N34.	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
	Chlorate and magnesium chloride mixtures	5.1	UN1459	II	OXIDIZER	B10, N13, N34, T8.	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
	Chlorate of potash, see Potassium chlorate.													
	Chlorate of soda, see Sodium chlorate													
	Chlorates, inorganic, n.o.s.	5.1	UN1461	II	OXIDIZER	B10, N13, N34.	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
DE	Chlordane (*RQ-1/0.454*)	6.1	NA2762	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	
	Chloric acid solution, *with not more than 10 per cent chloric acid.*	5.1	UN2626	I	OXIDIZER	T25	None	229	243	Forbidden	Forbidden	1	5	46, 56
	Chloride of phosphorus, see Phosphorus trichloride.													
	Chloride of sulfur, see Sulfur chloride													
	Chlorinated anthracene oil	6.1	UN2230	II	POISON		None	202	243	5 L	60 L	1,2	1	
	Chlorinated lime, see Calcium hypochlorite mixtures, *etc.*													
E	Chlorine (*RQ-10/4.54*)	2.3	UN1017	IB	POISON GAS	B14, B31, 10.	None	304	314, 315	Forbidden	Forbidden	1	5	40, 51, 55, 62, 68, 95

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Chlorine azide	Forbidden												
D	Chlorine dioxide hydrate, frozen	5.1	NA9191	II	OXIDIZER, POISON.		None	229	None	Forbidden	Forbidden	5	5	
	Chlorine dioxide (not hydrate)	Forbidden												
	Chlorine pentafluoride	2.3	UN2548	IA	POISON GAS, OXIDIZER, CORROSIVE.	10	None	304	245	Forbidden	Forbidden	1	5	31, 40, 95
	Chlorine trifluoride	2.3	UN1749	IA	POISON GAS, OXIDIZER, CORROSIVE.	10	None	304	245	Forbidden	Forbidden	1,3	5	34, 40, 95
	Chlorites, inorganic, n.o.s.	5.1	UN1462	II	OXIDIZER	N26, N34, T8.	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
	Chloroacetaldehyde	6.1	UN2232	II	POISON	T17	None	202	243	5 L	60 L	1	5	40, 95
	Chloroacetic acid, liquid	8	UN1750	I	CORROSIVE, POISON.	B8, B14, B32, N26, N34, 10.	None	227	244	Forbidden	Forbidden	1,2	1,2	40
	Chloroacetic acid, solid	8	UN1751	II	CORROSIVE, POISON.	N1, N26, N34.	None	212	242	15 kg	50 kg	1,2	1,2	40
	Chloroacetone, stabilized	6.1	UN1695	II	POISON	N12, N32, N34, T17.	None	202	243	Forbidden	60 L	1	5	40, 95
	Chloroacetone (unstabilized)	Forbidden												
	Chloroacetonitrile	6.1	UN2668	I	POISON	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,3	1,3	12, 21, 25, 26, 40, 95
	Chloroacetophenone (*CN*)*Liquid*	6.1	UN1697	I	POISON	B14, B30, N1, N12, N16, N17, N32, N33, 10.	None	226	244	Forbidden	Forbidden	1	5	12, 40, 95
	Chloroacetyl chloride	8	UN1752	II	CORROSIVE	B2, B8, N1, N11, N26, N34, T9, T26.	None	202	242	Forbidden	30 L	1	5	40
	Chloroanilines, liquid	6.1	UN2019	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	95
	Chloroanilines, solid	6.1	UN2018	II	POISON	T14, T38	None	212	242	25 kg	100 kg	1,2	1,2	95
	Chloroanisidines	6.1	UN2233	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***) Exceptions	Non-bulk packaging	Bulk packaging	(9) Quantity limitations Passenger aircraft or railcar	Cargo aircraft only	(10) Vessel stowage requirements Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
E	Chlorobenzene (*RQ-100/45.4*)	3	UN1134	III	FLAMMABLE LIQUID.	T1	150	203	241	5 L	60 L	1,3	1	
	Chlorobenzol, see Chlorobenzene													
	Chlorobenzotrifluorides	3	UN2234	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	40
	p-Chlorobenzoyl peroxide, *see* Di-4-chlorobenzoyl peroxide, *etc.*.													
	Chlorobenzylchlorides	6.1	UN2235	III	KEEP AWAY FROM FOOD.	T8	153	203	241	60 L	220 L	1,2	1,2	34
	1-Chloro-3-bromopropane	6.1	UN2688	III	KEEP AWAY FROM FOOD.	T2	153	203	241	60 L	220 L	1,2	1,2	34
	Chlorobutanes	3	UN1127	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Chlorocresols (*liquids*)	6.1	UN2669	II	POISON	T8	None	202	243	5 L	60 L	1,3	1,3	12, 95
	Chlorocresols (*solid*)	6.1	UN2669	II	POISON		None	212	242	25 kg	100 kg	1,3	1,3	12, 40, 95
	3-Chloro-4-diethylaminobenzenediazonium zinc chloride.	4.1	UN3033	II	FLAMMABLE SOLID.		None	214	None	15 kg	50 kg	1	1	25
	Chlorodifluorobromomethane	2.2	UN1974		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	50 kg	1,3	1,3	85
	1-Chloro-1,1-difluoroethane, see Chlorodifluoroethanes.													
	Chlorodifluoroethanes *or* Difluorochloroethanes.	2.1	UN2517		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	Chlorodifluoromethane (*R-22*)	2.2	UN1018		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
	Chlorodifluoromethane and chloropentafluoroethane mixture *with fixed boiling point, with approximately 49 per cent chlorodifluoromethane.*	2.2	UN1973		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
	Chlorodinitrobenzene	6.1	UN1577	II	POISON	T14	None	212	242	25 kg	100 kg	1,2	1,2	95
AEW	Chloroform (*RQ-5000/2270*)	6.1	UN1888	II	POISON	N36, T14	None	202	243	5 L	60 L	1,2	1,2	40, 95
	Chloroformates, n.o.s., *flash point not less than 23 degrees C.*	6.1	UN2742	II	POISON, CORROSIVE, FLAMMABLE LIQUID.		None	202	243	1 L	30 L	1,3	1,3	12, 13, 22, 25, 40, 95
	Chloromethylchloroformate	6.1	UN2745	II	POISON, CORROSIVE.	T18	None	202	243	1 L	30 L	1,3	1,3	12, 13, 23, 25, 40, 95
	Chloromethyl ethyl ether	3	UN2354	II	FLAMMABLE LIQUID, POISON.	T8	None	202	243	1 L	60 L	1,3	5	12, 40
	3-Chloro-4-methylphenylisocyanate	6.1	UN2236	II	POISON		None	202	243	5 L	60 L	1,2	1,2	25, 40, 95
	Chloronitroanilines	6.1	UN2237	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	26, 34
	Chloronitrobenzene, *ortho, liquid*	6.1	UN1578	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	95
	Chloronitrobenzenes *meta or para, solid*	6.1	UN1578	II	POISON	T14	None	212	242	25 kg	100 kg	1,2	1,2	95
	Chloronitrotoluenes	6.1	UN2433	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Chloropentafluoroethane (*R-115*)	2.2	UN1020		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
	3-Chloroperoxybenzoic acid, *not more than 86 per cent with 3-chlorobenzoic acid.*	5.2	UN2755	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	3-Chloroperoxybenzoic acid, *not more than 57 per cent with water and 3-Chlorobenzoic acid.*	5.2	UN3081	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Chlorophenates, liquid	8	UN2904	III	CORROSIVE		154	203	241	5 L	60 L	1,2	1,2	
	Chlorophenates, solid	8	UN2905	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
	Chlorophenols, liquid	6.1	UN2021	III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	1,2	34
	Chlorophenols, solid	6.1	UN2020	III	KEEP AWAY FROM FOOD.	T7	153	213	240	100 kg	200 kg	1,2	1,2	34
	Chlorophenyl trichlorosilane	8	UN1753	II	CORROSIVE	B2, B6, N16, N26, N34, T8, T26.	None	202	242	Forbidden	30 L	1	1	40
	Chloropicrin	6.1	UN1580	I	POISON	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1	5	40, 95
	Chloropicrin and methyl bromide mixtures	2.3	UN1581	IB	POISON GAS	B13, B14, B31, 10.	None	193	244	Forbidden	Forbidden	1	5	25, 40, 95
	Chloropicrin and methyl chloride mixtures	2.3	UN1582	IB	POISON GAS	B13, B14, B31, 10.	None	193	244	Forbidden	Forbidden	1	5	25, 40, 95
	Chloropicrin mixture, flammable (pressure not exceeding 14.7 psia at 115 degrees F flash point below 100 deg F) see Poisonous liquids, flammable, n.o.s.													
	Chloropicrin mixtures, n.o.s.	6.1	UN1583	I	POISON	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1	1	40, 95
				II	POISON		None	201	243	.5 L	2.5 L	1	1	40, 95
	Chloropivaloyl chloride	6.1	NA2810	I	POISON	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,2	1	20, 40, 95
	Chloroplatinic acid, solid	8	UN2507	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
	Chloroprene, inhibited	3	UN1991	I	FLAMMABLE LIQUID, POISON.	T15	None	201	243	Forbidden	30 L	1,3	1	12, 40
	Chloroprene, uninhibited	Forbidden												
	2-Chloropropane	3	UN2356	I	FLAMMABLE LIQUID.	N15, N36, T14.	150	201	243	1 L	30 L	1,3	5	12
	3-Chloropropanol-1	6.1	UN2849	III	KEEP AWAY FROM FOOD.	T8	153	203	241	60 L	220 L	1,2	1,2	34
	2-Chloropropene	3	UN2456	I	FLAMMABLE LIQUID.	N1, N15, N36, T14.	150	201	243	Forbidden	30 L	1,3	5	12
	alpha-Chloropropionic acid	8	UN2511	III	CORROSIVE	T8	154	203	241	5 L	60 L	1,2	1,2	8
	2-Chloropyridine	6.1	UN2822	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	40, 95
	Chlorosilanes, n.o.s.	8	UN2987	II	CORROSIVE	B2	154	202	242	1 L	30 L	1	1	40, 77

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Chlorosilanes, n.o.s., *flash point less than 23 degrees C.*	3	UN2985	I	FLAMMABLE LIQUID, CORROSIVE.		None	201	243	0.5 L	2.5 L	1,3	5	40
	Chlorosilanes, n.o.s., *flash point not less than 23 degrees C.*	8	UN2986	II	CORROSIVE, FLAMMABLE LIQUID.		None	202	243	1 L	30 L	1	1	23, 40
	Chlorosilanes, n.o.s., *which in contact with water emit flammable gas.*	4.3	UN2988	I	DANGEROUS WHEN WET, FLAMMABLE LIQUID, CORROSIVE.	A2	None	201	244	Forbidden	1 L	1	5	40
E	Chlorosulfonic acid (*with or without sulfur trioxide*) (*RQ-1000/454*).	8	UN1754	I	CORROSIVE	B4, N1, N11, N35, T12, T27.	None	201	242	.5 L	2.5 L	1	1	80, 33, 40
	Chlorotetrafluoroethane (*R-124*)	2.2	UN1021		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
	Chlorotoluenes	3	UN2238	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	4-Chloro-o-toluidine hydrochloride	6.1	UN1579	III	KEEP AWAY FROM FOOD.		153	213	241	100 kg	200 kg	1,2	1,2	34
	Chlorotoluidines *liquid*	6.1	UN2239	III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	1,2	34
							153	213	260l	100 kg	200 kg	1,2	1,2	
	Chlorotoluidines *solid*	6.1	UN2239	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Chlorotrifluoroethane	2.2	UN1983		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
	Chlorotrifluoromethane (*R-13*)	2.2	UN1022		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
	Chlorotrifluoromethane and trifluoromethane azeotropic mixture *with approximately 60 per cent chlorotrifluoromethane.*	2.2	UN2599		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
ADE	Chlorpyrifos (*RQ-1/0.454*)	6.1	NA2783	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
DE	Chromic acetate (*RQ-1000/454*)	ORM-E	NA9101	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Chromic acid, solid (*RQ-1000/454*)	5.1	NA1463	II	OXIDIZER, CORROSIVE.	B10	None	212	240	5 kg	25 kg	1,2	1,2	
E	Chromic acid solution (*RQ-1000/454*)	8	UN1755	II	CORROSIVE	B2, T9, T27.	154	202	242	1 L	30 L	1	1	40
	Chromic anhydride, see Chromium trioxide, anhydrous.													
	Chromic fluoride, solid	8	UN1756	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	
	Chromic fluoride, solution	8	UN1757	II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1,2	1,2	
DE	Chromic sulfate (*RQ-1000/454*)	ORM-E	NA9100	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Chromium nitrate	5.1	UN2720	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,2	1,2	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Chromium oxychloride	8	UN1758	I	CORROSIVE	B4, N1, N11, N26, N34, T12, T26.	None	201	242	Forbidden	2.5 L	1	1	80, 40
E	Chromium trioxide, anhydrous (*RQ-1000/454*).	5.1	UN1463	II	OXIDIZER, CORROSIVE.	B10	None	212	240	5 kg	25 kg	1,2	1,2	34, 65
	Chromosulfuric acid	8	UN2240	I	CORROSIVE	B4, B6, N1, N11, N26, N34, T12, T27.	None	201	242	.5 L	2.5 L	1,2	1	80, 9, 40
DE	Chromous chloride (*RQ-1000/454*)	ORM-E	NA9102	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Chromyl chloride, see Chromium oxychloride.													
	Cigar and cigarette lighter fluid, see Lighter fluids.													
	Cigar and cigarette lighters, charged with fuel, see Lighters for cigars, cigarettes, *etc.*.													
	Cigarettes, self-lighting	4.1	UN1867	III	FLAMMABLE SOLID.		None	213	None	Forbidden	Forbidden	1,3	1,3	13
	Coal briquettes, hot	Forbidden												
	Coal gas	2.3	UN1023	II	POISON GAS, FLAMMABLE GAS.	B38, 10	None	302	245	Forbidden	Forbidden	1	5	40, 95
	Coal tar distillates, flammable	3	UN1136	I	FLAMMABLE LIQUID.	T8	150	201	243	1 L	30 L	1,3	5	
				II	FLAMMABLE LIQUID.	T7, T30	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1,3	
	Coal tar dye, corrosive, liquid, n.o.s, see Dyes, n.o.s. *or* Dye intermediates, n.o.s., *corrosive.*													
	Coating solution	3	UN1139	II	FLAMMABLE LIQUID.	T7, T30	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1,3	
	Cobalt naphthenates, powder	4.1	UN2001	III	FLAMMABLE SOLID.	A19	151	213	240	25 kg	100 kg	1,3	1,3	
DE	Cobaltous bromide (*RQ-1000/454*)	ORM-E	NA9103	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Cobaltous formate (*RQ-1000/454*)	ORM-E	NA9104	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Cobaltous sulfamate (*RQ-1000/454*)	ORM-E	NA9105	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Cobalt resinate, precipitated	4.1	UN1318	III	FLAMMABLE SOLID.	A1, A19	151	213	240	25 kg	100 kg	1,3	1,3	

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Cocculus	6.1	UN1584	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Coke, hot	Forbidden												
	Collodion, see Nitrocellulose *etc.*													
D	Combustible liquid, n.o.s.	3	NA1993	III	None		150	203	241	60 L	220 L	1,3	1,3	
	Components, explosive train, n.o.s.	1.2B	UN0382											
	Components, explosive train, n.o.s.	1.4B	UN0383											
	Components, explosive train, n.o.s.	1.4S	UN0384											
	Composition B, see Hexolite, *etc.*													
	Compounds, cleaning liquid, corrosive, see Corrosive liquids, n.o.s.													
	Compounds, cleaning liquid, flammable, see Flammable liquid preparations, *etc.*													
	Compressed *or* Liquefied gases, flammable, n.o.s.	2.1	UN1954		FLAMMABLE GAS.	B13	306	302, 304, 305	244	Forbidden	150 kg	1	5	40
	Compressed *or* Liquefied gases, flammable, toxic, n.o.s. *LC50 less than or equal to 1000 ppm.*	2.3	UN1953	IB	POISON GAS, FLAMMABLE GAS.	10	None	302, 304, 305	245	Forbidden	Forbidden	1	5	40, 95
	Compressed *or* Liquefied gases, n.o.s.	2.2	UN1956		NONFLAMMABLE GAS.	B13	306, 307	302, 304, 305	244	75 kg	150 kg	1,3	1,3	85
	Compressed *or* Liquefied gases, toxic, n.o.s. *LC50 less than or equal to 200 ppm.*	2.3	UN1955	IA	POISON GAS	10	None	302, 304, 305	245	Forbidden	Forbidden	1	5	40, 95
	Compressed *or* liquefied gases, flammable, toxic, n.o.s. *LC50 over 1000 up to 5000 ppm.*	2.3	UN1953	II	POISON GAS, FLAMMABLE GAS.	B14, B38, 10.	None	302, 304, 305	244	Forbidden	Forbidden	1	5	40
	Compressed *or* liquefied gases, toxic, n.o.s. *LC50 over 200 up to 5000 ppm.*	2.3	UN1955	II	POISON GAS	B14, B35, 10.	None	302, 304, 305	244	Forbidden	Forbidden	1	5	40
D	Consumer commodity	ORM-D	None	III	None		156, 306	156, 306	None	65 lb gross	65 lb gross	1,2	1,2	
	Contrivances, water-activated, *with burster, expelling charge or propelling charge.*	1.2L	UN0248											
	Contrivances, water-activated, *with burster, expelling charge or propelling charge.*	1.3L	UN0249											
E	Copper acetoarsenite (*RQ-100/45.4*)	6.1	UN1585	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Copper acetylide	Forbidden												
	Copper amine azide	Forbidden												
	Copper arsenite	6.1	UN1586	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Copper based pesticides, liquid, flammable, toxic n.o.s., *flash point less than 23 degrees C.*	3	UN2776	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	1	
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***) Exceptions	Non-bulk packaging	Bulk packaging	(9) Quantity limitations Passenger aircraft or railcar	Cargo aircraft only	(10) Vessel stowage requirements Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Copper based pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23 degrees C.*	6.1	UN3009	I	POISON, FLAMMABLE LIQUID.	T42	None	201	243	1 L	30 L	1	1	21, 40, 95
				II	POISON, FLAMMABLE LIQUID.	T14	None	202	243	5 L	60 L	1,2	1	21, 40, 95
	Copper based pesticides, liquid, toxic, n.o.s.	6.1	UN3010	I	POISON	T42	None	201	243	1 L	30 L	1	1	40, 95
				II	POISON	T14	None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Copper based pesticides, solid, toxic, n.o.s.	6.1	UN2775	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	40, 95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34, 40
	Copper chlorate	5.1	UN2721	II	OXIDIZER	A1, B10	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
AEW	Copper chloride (*RQ-10/4.54*)	8	UN2802	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
	Copper cyanide	6.1	UN1587	II	POISON		None	204	242	25 kg	100 kg	1,2	1,2	26, 95
	Copper selenate, *see* Selenates *or* Selenites.													
	Copper selenite, *see* Selenates *or* Selenites.													
	Copper tetramine nitrate	Forbidden												
AW	Copra	4.2	UN1363	III	None		None	213	241	Forbidden	Forbidden	1,3	1,3	13, 19
	Cord, detonating, *flexible*	1.1D	UN0065											
	Cord, detonating, *flexible*	1.4D	UN0289											
	Cordeau detonant fuse, see Cord (Fuse), detonating, *etc.;* Cord, detonating, *flexible.*													
	Cord (Fuse), detonating, *metal clad*	1.2D	UN0102											
	Cord (Fuse), detonating, *metal clad*	1.1D	UN0290											
	Cord (Fuse), detonating, mild effect *metal clad.*	1.4D	UN0104											
	Cord, igniter	1.4G	UN0066											
	Cordite, see Powder, smokeless													
	Corrosive liquids, flammable, n.o.s.	8	UN2920	I	CORROSIVE, FLAMMABLE LIQUID.	B4, N1, N11, N34, T42.	None	201	243	0.5 L	2.5 L	1	1	12, 21, 25
				II	CORROSIVE, FLAMMABLE LIQUID.	B2, T15, T26.	None	202	243	1 L	30 L	1	1	12, 21, 25
	Corrosive liquids, n.o.s.	8	UN1760	I	CORROSIVE	B4, N1, N11, N26, N34, T42.	None	201	242	0.5 L	2.5 L	1,2	1	40
				II	CORROSIVE	B2, T14	154	202	242	1 L	30 L	1,2	1	40
				III	CORROSIVE	T7	154	203	240	5 L	60 L	1,2	1,2	40

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Corrosive liquids, poisonous, n.o.s.	8	UN2922	I	CORROSIVE, POISON.	N1, N11, N34.	None	201	243	0.5 L	2.5 L	1,2	1	40
				II	CORROSIVE, POISON.		None	202	243	1 L	30 L	1,2	1,2	40
				III	CORROSIVE		154	203	241	5 L	60 L	1,2	1,2	40
	Corrosive solids, flammable, n.o.s.	8	UN2921	I	CORROSIVE, FLAMMABLE SOLID.		None	211	242	1 kg	25 kg	1,3	1	12, 25
				II	CORROSIVE, FLAMMABLE SOLID.		None	212	242	15 kg	50 kg	1,3	1	12, 25
	Corrosive solids, n.o.s.	8	UN1759	I	CORROSIVE		None	211	240	1 kg	25 kg	1,2	1	
				II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	
				III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
	Corrosive solids, oxidizing, n.o.s.	8	UN3084	I	CORROSIVE, OXIDIZER.		None	211	240	1 kg	25 kg	1,2	1	
				II	CORROSIVE, OXIDIZER.		None	212	240	15 kg	50 kg	1,2	1	
	Corrosive solids, poisonous, n.o.s.	8	UN2923	I	CORROSIVE, POISON.		None	211	242	1 kg	25 kg	1,2	1	13, 40
				II	CORROSIVE, POISON.		None	212	240	15 kg	50 kg	1,2	1	40
				III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1	40
DW	Cotton	9	NA1365	III	None		155	None	240	No limit	No limit	1,2	1,2	
!	Cotton waste, oily	4.2	UN1364	III	SPONTANEOUSLY COMBUSTIBLE.		None	213	None	Forbidden	Forbidden	1,3	1,3	13, 54, 64
AIW	Cotton, wet	4.2	UN1365	III	SPONTANEOUSLY COMBUSTIBLE.		None	213	241	Forbidden	Forbidden	1,3	1,3	13
DE	Coumaphos (*RQ-10/4.54*)	6.1	NA2783	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	
	Coumarin derivative pesticides, liquid, flammable, toxic, n.o.s., *flashpoint less than 23 deg C.*	3	UN3024	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	5	
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	
	Coumarin derivative pesticides, liquid, toxic, flammable, n.o.s. *flashpoint not less than 23 deg C.*	6.1	UN3025	I	POISON, FLAMMABLE LIQUID.		None	201	243	1 L	30 L	1	1	21, 40, 95
				II	POISON, FLAMMABLE LIQUID.		None	202	243	5 L	60 L	1,2	1	21, 40, 95
				III	KEEP AWAY FROM FOOD, FLAMMABLE LIQUID.	B1	153	203	241	60 L	220 L	1,2	1,2	21, 34, 40

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Coumarin derivative pesticides, liquid, toxic, n.o.s.	6.1	UN3026	I	POISON		None	201	243	1 L	30 L	1	1	40, 95
				II	POISON		None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34, 40
	Coumarin derivative pesticides, solid, toxic, n.o.s.	6.1	UN3027	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
D	Creosote, coal tar	3	NA1993	III	FLAMMABLE LIQUID.		150	203	241	60 L	220 L	1,3	1,3	
E	Cresols (*o-,m-,p-*) (*RQ-1000/454*)	6.1	UN2076	II	POISON	T8	None	202	243	5 L	60 L	1,2	1,2	95
	Cresylic acid	6.1	UN2022	II	POISON	T8	None	202	243	5 L	60 L	1,2	1,2	
E	Crotonaldehyde, stabilized (*RQ-100/45.4*)	3	UN1143	I	FLAMMABLE LIQUID, POISON.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,3	1	
	Crotonic acid	8	UN2823	III	CORROSIVE		154	203	240	5 L	60 L	1,3	1,3	12
	Crotonylene	3	UN1144	I	FLAMMABLE LIQUID.	T20	150	201	243	1 L	30 L	1,3	5	12
	Cumene hydroperoxide, *see* Cumyl hydroperoxide.													
	Cumyl hydroperoxide (Cumene hydroperoxide), *technically pure.*	5.2	UN2116	I	ORGANIC PEROXIDE.	B17, B22, T25.	None	225	243	1 L	5 L	1	5	12, 40
	Cumyl peroxyneodecanoate, *not more than 77 per cent in solution.*	5.2	UN2963	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Cumyl peroxypivalate, *not more than 77 per cent in solution.*	5.2	UN2964	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
DE	Cupric acetate (*RQ-100/45.4*)	ORM-E	NA9106	III	None		156	203	240	No limit	No limit	a,2	1,2	
DE	Cupric nitrate (*RQ-100/45.4*)	5.1	NA1479	II	OXIDIZER		152	212	240	5 kg	25 kg	1,2	1,2	
DE	Cupric oxalate (*RQ-100/45.4*)	6.1	NA2449	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
DE	Cupric sulfate (*RQ-10/4.54*)	ORM-E	NA9109	III	None		156	203	240	No limit	No limit	1,2	1,2	
DE	Cupric sulfate, ammoniated (*RQ-100/45.4*)	ORM-E	NA9110	III	None		156	203	240	No limit	No limit	1,2	1,2	
DE	Cupric tartrate (*RQ-100/45.4*)	ORM-E	NA9111	III	None		156	203	240	No limit	No limit	1,2	1,2	
	Cupriethylenediamine solution	8	UN1761	II	CORROSIVE, POISON.	T8, T26	154	202	243	1 L	30 L	1,2	1,2	
	Cutters, cable, explosive	1.4S	UN0070											
	Cyanide or cyanide mixtures, dry, see Cyanides, inorganic, n.o.s.													
	Cyanides, inorganic, n.o.s.	6.1	UN1588	I	POISON	N74, N75	None	211	242	5 kg	50 kg	1,2	1,2	26, 95
				II	POISON	N74, N75	None	212	242	25 kg	100 kg	1,2	1,2	26, 95
				III	KEEP AWAY FROM FOOD.	N74, N75	None	213	240	100 kg	200 kg	1,2	1,2	26
	Cyanide solutions	6.1	UN1935	I	POISON	B37, T18, T26.	None	201	243	1 L	30 L	1,2	1,2	26, 40, 95
				II	POISON	T18, T26	None	202	243	5 L	60 L	1,2	1,2	26, 40

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Cyanogen bromide	6.1	UN1889	I	POISON, CORROSIVE.	B14, B30, N2, N11, 10.	None	211	244	Forbidden	Forbidden	1	5	20, 25, 40, 95
E	Cyanogen chloride (*RQ-10/4.54*)	2.3	UN1589	IA	POISON GAS, FLAMMABLE GAS.	10	None	192	245	Forbidden	Forbidden	1	5	40, 95
	Cyanogen, liquefied	2.3	UN1026	IB	POISON GAS, FLAMMABLE GAS.	B14, B31, 10.	None	192	244	Forbidden	Forbidden	1	5	34, 40
AW	Cyanuric chloride	8	UN2670	III	CORROSIVE		None	213	240	25 kg	100 kg	1,3	1,3	12, 40
	Cyanuric triazide	Forbidden												
	Cyclobutane	2.1	UN2601		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	Cyclobutylchloroformate	6.1	UN2744	II	POISON, CORROSIVE.	T18	None	202	243	1 L	30 L	1,3	1,3	12, 13, 23, 25, 40, 95
	1,5,9-Cyclododecatriene	6.1	UN2518	III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	5	34, 40
	Cycloheptane	3	UN2241	II	FLAMMABLE LIQUID.	T1	None	202	242	5 L	60 L	1,3	1	40
	Cycloheptatriene	3	UN2603	II	FLAMMABLE LIQUID, POISON.	T14	None	202	243	1 L	60 L	1,3	5	12, 40
	Cycloheptene	3	UN2242	II	FLAMMABLE LIQUID.	T7	150	202	241	5 L	60 L	1,3	1	
E	Cyclohexane (*RQ-1000/454*)	3	UN1145	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	5	12
	Cyclohexanone	3	UN1915	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Cyclohexanone peroxide(s) (*1-Hydroxy-1'-hydroperoxy dicyclohexyl peroxide, technically pure, or 1-Hydroxy-1'-hydroperoxy dicyclohexyl peroxide and Di-(1-hydroxy cyclohexyl) peroxide mixtures), more than 90 per cent with water with not more than 9 percent available oxygen.*	5.2	UN2117	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Cyclohexanone peroxide(s) (*1-Hydroxy-1'-hydroperoxy dicyclohexyl peroxide, technically pure, or 1-Hydroxy-1'-hydroperoxy dicyclohexyl peroxide and Di-(1-hydroxy cyclohexyl) peroxide mixtures), not more than 90 per cent with water with not more than 9 percent available oxygen.*	5.2	UN2119	I	ORGANIC PEROXIDE.		None	225	None	1 kg	5 kg	1	5	12, 40
	Cyclohexanone peroxide(s), *not more than 72 per cent as a paste with not more than 9 per cent available oxygen.*	5.2	UN2896	II	ORGANIC PEROXIDE.		152	225	None	1 kg	5 kg	1	5	12, 40

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Cyclohexanone peroxide(s), *not more than 72 per cent in solution with not more than 9 per cent available oxygen.*	5.2	UN2118	I	ORGANIC PEROXIDE.		None	225	None	1 kg	5 kg	1	5	12, 40
	Cyclohexene	3	UN2256	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	12
	Cyclohexenyltrichlorosilane	8	UN1762	II	CORROSIVE	B2, N16, N26, N34, T8, T26.	None	202	242	Forbidden	30 L	1	1	40
	Cyclohexyl acetate	3	UN2243	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Cyclohexylamine	8	UN2357	II	CORROSIVE, FLAMMABLE LIQUID.	T8, T26	None	202	243	1 L	30 L	1,3	1,3	
	Cyclohexyl isocyanate	6.1	UN2488	I	POISON	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1	5	21, 25, 40, 95
	Cyclohexyl mercaptan	3	UN3054	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Cyclohexyltrichlorosilane	8	UN1763	II	CORROSIVE	B2, N16, N26, N34, T8, T26.	None	202	242	Forbidden	30 L	1	1	40
	Cyclonite, *see* Cyclotrimethylenetrinitramine, *etc.*.													
	Cyclooctadiene phosphines, *see* 9-Phosphabicyclononanes.													
	Cyclooctadienes	3	UN2520	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Cyclooctatetraene	3	UN2358	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Cyclopentane	3	UN1146	II	FLAMMABLE LIQUID.	T14	150	202	242	5 L	60 L	1,3	5	12
	Cyclopentane, methyl, see Methyl cyclopentane.													
	Cyclopentanol	3	UN2244	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Cyclopentanone	3	UN2245	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Cyclopentene	3	UN2246	II	FLAMMABLE LIQUID.	T13	150	202	242	5 L	60 L	1,3	5	12
	Cyclopropane, liquified	2.1	UN1027		FLAMMABLE GAS.	B13	306	304	244	Forbidden	150 kg	1,3	1	40, 85
	Cyclotetramethylene tetranitramine (dry or unphlegmatized) (HMX).	Forbidden												
	Cyclotetramethylenetetranitramine (HMX; Octogen), wetted *with not less than 15 per cent water, by weight, or* Cyclotetramethylenetetranitramine (HMX; Octogen) desensitized *with not less than 10 per cent phlegmatizer, by weight.*	1.1D	UN0226											

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Cyclotrimethylenetrinitramine (Cyclonite; Hexogen; RDX), and Cyclotetramethylenetetranitramine (HMX; Octogen) mixtures, wetted *with not less than 15 per cent water, by weight, or* Cyclotrimethylenetrinitramine (Cyclonite; Hexogen; RDX) and Cyclotetramethylenetetranitramine (HMX; Octogen) mixtures desensitized *with not less than 10 per cent phlegmatizer, by weight.*	1.1D	UN0391											
	Cyclotrimethylenetrinitramine (Cyclonite; Hexogen; RDX) wetted *with not less than 15 per cent water, by weight, or* Cyclotrimethylenetrinitramine (Cyclonite; Hexogen; RDX) desensitized *with not less than 10 per cent phlegmatizer, by weight.*	1.1D	UN0072											
	Cymenes	3	UN2046	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	2,4-D. *See* 2,4-Dichlorophenoxyacetic acid													
DE	DDT *or* Dichlorodiphenyltrichloroethane (*RQ-1/0.454*).	6.1	NA2761	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
	Decaborane	4.1	UN1868	II	FLAMMABLE SOLID, POISON.	A19, A20	None	212	None	Forbidden	50 kg	1,3	1,3	
	Decahydronaphthalene	3	UN1147	III	FLAMMABLE LIQUID.	T1	150	203	242	5 L	60 L	1,3	1	40
	n-Decane	3	UN2247	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Decanoyl peroxide, *see* Didecanoyl peroxide, *technically pure.*													
	Deflagrating metal salts of aromatic nitroderivatives, n.o.s.	1.3C	UN0132											
	Delay electric igniter, see Igniters													
D	Denatured alcohol	3	NA1986	II	FLAMMABLE LIQUID.		150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1	150	203	242	60 L	220 L	1,3	1,3	
	Depth charges, see Charges, depth													
AE	2,4-D ester. *See* 2,4-Dichlorophenoxyacetic acid ester.													
	Detonating relays, see Detonators, *etc.*													
	Detonator assemblies, non-electric *for blasting.*	1.1B	UN0360											
	Detonator assemblies, non-electric, *for blasting.*	1.4B	UN0361											
	Detonators, electric, *for blasting*	1.1B	UN0030											
	Detonators, electric, *for blasting*	1.4B	UN0255											
	Detonators for ammunition	1.1B	UN0073											
	Detonators for ammunition	1.2B	UN0364											

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Detonators for ammunition	1.4B	UN0365											
	Detonators for ammunition	1.4S	UN0366											
	Detonators, non-electric, *for blasting*	1.1B	UN0029											
	Detonators, non-electric, *for blasting*	1.4B	UN0267											
	Deuterium	2.1	UN1957		FLAMMABLE GAS.	B13	306	302	244	Forbidden	150 kg	1,3	5	40, 85
	Diacetone alcohol	3	UN1148	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Diacetone alcohol peroxides, more than 57% in solution with more than 9% hydrogen peroxide, less than 26% diacetone alcohol and less than 9% water; total active oxygen content more than 9% by weight.	Forbidden												
	Diacetone alcohol peroxides, *not more than 57 per cent in solution with not more than 9 per cent hydrogen peroxide, not less than 26 per cent diacetone alcohol and not less than 9 per cent water; total active oxygen content not more than 9 per cent.*	5.2	UN2163	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Diacetyl, see Butanedione													
	Diacetyl peroxide (Acetyl peroxide), *not more than 25 per cent in solution (dimethyl phthalate or other approved phlegmatizer).*	5.2	UN2084	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Diacetyl peroxide, solid, or more than 25% in solution.	Forbidden												
	Diallylamine	3	UN2359	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	40
	Diallylether	3	UN2360	II	FLAMMABLE LIQUID, POISON.	N12, T8	None	202	243	1 L	60 L	1,3	5	12, 40
	4,4'-Diaminodiphenyl methane	6.1	UN2651	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Di-n-amylamine	6.1	UN2841	I	POISON	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1	1,3	12, 40, 95
	p-Diazidobenzene	Forbidden												
	1,2-Diazidoethane	Forbidden												
DE	Diazinon (*RQ-1/0.454*)	6.1	NA2783	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
	1,1'-Diazoaminonaphthalene	Forbidden												
	Diazoaminotetrazole (dry)	Forbidden												

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Diazodinitrophenol (dry)	Forbidden												
	Diazodinitrophenol, wetted *with not less than 40 per cent water, by weight, or mixture of alcohol and water.*	1.1A	UN0074											
	Diazodiphenylmethane	Forbidden												
	2-Diazo-1-naphthol-4-sulpho-chloride	4.1	UN3042	II	FLAMMABLE SOLID.		None	212	None	15 kg	50 kg	1	5	25
	2-Diazo-1-naphthol-5-sulpho-chloride	4.1	UN3043	II	FLAMMABLE SOLID.		None	212	None	15 kg	50 kg	1	5	25
	Diazonium nitrates (dry)	Forbidden												
	Diazonium perchlorates (dry)	Forbidden												
	1,3-Diazopropane	Forbidden												
	Dibenzoyl peroxide (Benzoyl peroxide), *more than 77 per cent but less than 95 per cent with water.*	5.2	UN2088	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Dibenzoyl peroxide (Benzoyl peroxide), *not less than 30 per cent but not more than 52 per cent with inert solid.*	5.2	UN2089	II	ORGANIC PEROXIDE.		152	225	None	10 kg	25 kg	1	5	12, 40
	Dibenzoyl peroxide (Benzoyl peroxide), *not more than 72 per cent as a paste.*	5.2	UN2087	II	ORGANIC PEROXIDE.		152	225	None	10 kg	25 kg	1	5	12, 40
	Dibenzoyl peroxide (Benzoyl peroxide), *not more than 77 per cent with water.*	5.2	UN2090	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	Dibenzoyl peroxide (Benzoyl peroxide), *technically pure, or* Dibenzoyl peroxide (Benzoyl peroxide), *more than 52 per cent with inert solid.*	5.2	UN2085	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Dibenzoyl peroxide *more than 72 percent but less than 95 percent as a paste.*	5.2	UN2086	I	ORGANIC PEROXIDE.		None	225	246	Forbidden	Forbidden	1	5	
	Dibenzyldichlorosilane	8	UN2434	II	CORROSIVE	B2, T8, T26.	154	202	242	1 L	30 L	1	1	40
	Dibenzyl peroxydicarbonate, more than 87 per cent with water.	Forbidden												
	Dibenzyl peroxydicarbonate, *not more than 87 per cent with water.*	5.2	UN2149	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Diborane	2.3	UN1911	IA	POISON GAS, FLAMMABLE GAS.	10	None	302	245	Forbidden	Forbidden	1	5	40, 57, 74, 95
D	Diborane mixtures	2.3	NA1911	IA	POISON GAS, FLAMMABLE GAS.	B35, 10	None	302	245	Forbidden	Forbidden	1	5	40, 57, 74, 95
	Dibromoacetylene	Forbidden												
	Dibromobenzene	3	UN2711	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	1,2-Dibromobutan-3-one	6.1	UN2648	II	POISON		None	202	243	5 L	60 L	1,2	1	40, 95

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Dibromochloropropane	6.1	UN2872	III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	1,2	34
A	Dibromodifluoromethane	9	UN1941	III	None	T13	155	203	241	100 L	220 L	1,2	1,2	25, 34
	1,2-Dibromoethane, see Ethylene dibromide.													
	Dibromomethane	6.1	UN2664	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34
	Di-(n-butyl)amine	8	UN2248	I	CORROSIVE, FLAMMABLE LIQUID.	B32, 10.	None	227	244	Forbidden	Forbidden	1,2	1,2	21, 40, 95
	Dibutylaminoethanol	6.1	UN2873	III	KEEP AWAY FROM FOOD.	T1	153	203	241	60 L	220 L	1,2	1,2	34
	Di-(4-tert-butylcyclohexyl) peroxydicarbonate, *not more than 42 per cent, stable dispersion, in water.*	5.2	UN2894	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Di-(4-tert-butylcyclohexyl) peroxydicarbonate, *technically pure.*	5.2	UN2154	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Dibutyl ethers	3	UN1149	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Di-tert-butyl peroxide (tert-Butyl-peroxide), *technically pure.*	5.2	UN2102	II	ORGANIC PEROXIDE, FLAMMABLE LIQUID.		152	225	None	1 L	5 L	1	5	12, 40
	2,2-Di-(tert-butylperoxy) butane, more than 55 per cent in solution.	Forbidden												
	2,2-Di-(tert-butylperoxy) butane, *not more than 55 per cent in solution.*	5.2	UN2111	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	1,1-Di-(tert-butylperoxy) cyclohexane, *not more than 40 per cent with inert inorganic solid with not less than 13 per cent in phlegmatizer.*	5.2	UN2885	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	1,1-Di-(tert-butylperoxy) cyclohexane, *not more than 50 per cent with phlegmatizer.*	5.2	UN2897	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	1,1-Di-(tertbutyl peroxy) cyclohexane *not more than 27% in solution with not less than 36% diluent type A and not less than 36% diluent type B.*	5.2	UN3069	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	2
	1,1-Di-(tert-butylperoxy) cyclohexane, *not more than 77 per cent in solution.*	5.2	UN2180	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	1,1-Di-(tert-butylperoxy) cyclohexane, *technically pure.*	5.2	UN2179	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Di-n-butyl peroxydicarbonate, more than 52 per cent in solution.	Forbidden												
	Di-n-butyl peroxydicarbonate, *not more than 52 per cent in solution.*	5.2	UN2169	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Di-n-butyl peroxydicarbonate, *not more than 27 per cent in solution.*	5.2	UN2170	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Di-sec-butyl peroxydicarbonate, *not more than 52 per cent in solution.*	5.2	UN2151	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Di-sec-butyl peroxydicarbonate, *technically pure.*	5.2	UN2150	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	1,4-Di-(2-tert-butylperoxyisopropyl) benzene, *technically pure, or* 1,4-Di-(2-tert-butylperoxyisopropyl) benzene, *more than 40 per cent with inert solid, or* 1,3-Di-(2-tert-butylperoxyisopropyl) benzene, *technically pure, or* 1,3-Di-(2-tert-butylperoxyisopropyl) benzene, *more than 40 per cent with inert solid, or* 1,4-Di-(2-tert-butylperoxyisopropyl) benzene and 1,3-Di-(2-tertbutylperoxyisopropyl) benzene mixtures, *technically pure, or* 1,4-Di-(2-tert-butylperoxyisopropyl) benzene and 1,3-Di-(2-tert-butylperoxyisopropyl) benzene mixtures, *more than 40 per cent with inert solid.*	5.2	UN2112	II	ORGANIC PEROXIDE.		152	225	None	10 kg	25 kg	1	5	12, 40
	Di-(tert-butylperoxy) phthalate, more than 55 per cent in solution.	Forbidden												
	Di-(tert-butylperoxy) phthalate, *not more than 55 per cent as a paste.*	5.2	UN2108	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	Di-(tert-butylperoxy) phthalate, *not more than 55 per cent in solution.*	5.2	UN2107	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	Di-(tert-butylperoxy) phthalate, *technically pure.*	5.2	UN2106	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	2,2-Di-(tert-butylperoxy) propane, *not more than 40 per cent with inorganic inert solid with not less than 13 per cent phlegmatizer.*	5.2	UN2884	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	2,2-Di-(tert-butylperoxy) propane, *not more than 50 per cent with phlegmatizer.*	5.2	UN2883	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	1,1-Di-(tert-butylperoxy)3,3,5-trimethyl cyclohexane, *not more than 57 per cent in solvent.*	5.2	UN2146	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	1,1-Di-(tert-butylperoxy)3,3,5-trimethyl cyclohexane, *not more than 58 per cent with inert solid.*	5.2	UN2147	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	1,1-Di-(tert-butylperoxy)3,3,5-trimethyl cyclohexane, *technically pure.*	5.2	UN2145	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
DE	Dicamba (*RQ-1000/454*)	ORM-E	NA2769	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Dicetyl peroxydicarbonate, *not more than 42 per cent stable dispersion, in water.*	5.2	UN2895	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Dicetyl peroxydicarbonate, *technically pure*	5.2	UN2164	II	ORGANIC PEROXIDE.		None	225	None	5 kg	10 kg	1	5	20, 40
DE	Dichlobenil (*RQ-1000/454*)	ORM-E	NA2769	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Dichlone (*RQ-1/0.454*)	ORM-E	NA2761	III	None		156	213	240	No limit	No limit	1,2	1,2	
	N,N'-Dichlorazodicarbonamidine (salts of) (dry).	Forbidden												

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Dichloroacetic acid	8	UN1764	II	CORROSIVE	B2, N1, N11, N26, N34, T9, T27.	154	202	242	1 L	30 L	1,2	1,2	
	1,3-Dichloroacetone	6.1	UN2649	II	POISON		None	212	243	25 kg	100 kg	1,3	1	12, 40, 95
	Dichloroacetyl chloride	8	UN1765	II	CORROSIVE	B2, B6, N1, N11, N26, N34, T8, T26.	154	202	242	1 L	30 L	1	5	40
	Dichloroacetylene	Forbidden												
	Dichloroanilines	6.1	UN1590	II	POISON	T14	None	202	242	5 L	60 L	1,2	1,2	26, 40, 95
E	o-Dichlorobenzene (*RQ-100/45.4*)	6.1	UN1591	III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	1,2	34
E	p-Dichlorobenzene (*RQ-100/45.4*)	6.1	UN1592	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Di-4-chlorobenzoyl peroxide (p-Chlorobenzoyl peroxide), *not more than 52 per cent as a paste.*	5.2	UN2114	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	Di-4-chlorobenzoyl peroxide (p-Chlorobenzoyl peroxide), *not more than 52 per cent in solution.*	5.2	UN2115	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	Di-4-chlorobenzoyl peroxide (p-Chlorobenzoyl peroxide), *not more than 77 per cent with water.*	5.2	UN2113	I	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
D	Dichlorobutene	8	NA2920	I	CORROSIVE, FLAMMABLE LIQUID.		None	201	243	.5 L	2.5 L	1,2	1	
	Dichlorodifluoromethane (*R-12*)	2.2	UN1028		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
	Dichlorodifluoromethane and difluoroethane azeotropic mixture (*R500*) *with approximately 74 per cent dichlorodifluoromethane.*	2.2	UN2602		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
	Dichlorodifluoromethane and ethylene oxide mixture, *with not more than 12% ethylene oxide.*	2.3	UN3070	III	POISON GAS, FLAMMABLE GAS.	B14, B33, 10.	None	304	244	Forbidden	Forbidden	1	5	40
	Dichlorodimethyl ether, symmetrical	6.1	UN2249	I	POISON	T25	None	201	243	Forbidden	30 L	1	5	23, 40, 95
	Dichlorodiphenyltrichloroethane. *See* DDT													
	1,1-Dichloroethane	3	UN2362	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	40
	1,2-Dichloroethane, see Ethylene dichloride.													

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Dichloroethylene	3	UN1150	II	FLAMMABLE LIQUID.	T14	150	202	242	5 L	60 L	1,3	1	
	Dichloroethyl ether	6.1	UN1916	II	POISON	N33, N34, T8.	None	202	243	5 L	60 L	1,2	1,2	95
	Dichloroethyl sulfide	Forbidden												
	Dichlorofluoromethane	2.2	UN1029		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
	Dichloroisocyanuric acid, dry *or* Dichloroisocyanuric acid salts.	5.1	UN2465	II	OXIDIZER	B10, 28	152	212	240	5 kg	25 kg	1,2	1,2	
	Dichloroisopropyl ether	6.1	UN2490	II	POISON	T8	None	202	243	5 L	60 L	1,2	1	95
	Dichloromethane	6.1	UN1593	III	KEEP AWAY FROM FOOD.	N36, T13	153	203	241	60 L	220 L	1,2	1,2	25, 34
D	Dichloromethane	9	NA1593	III	NONE	N36, T13	155	204	241	No limit	No limit	1,2	1,2	25
	1,1-Dichloro-1-nitroethane	6.1	UN2650	II	POISON	T8	None	202	243	5 L	60 L	1,3	1,3	12, 40, 95
	Dichloropentanes	3	UN1152	III	FLAMMABLE LIQUID.	B1, T1	150	202	241	5 L	60 L	1,3	1,3	
DE	2,4-Dichlorophenoxyacetic acid (*RQ-100/45.4*).	ORM-E	NA2765	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	2,4-Dichlorophenoxyacetic acid ester (*RQ-100/45.4*).	ORM-E	NA2765	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Dichlorophenyl isocyanates	6.1	UN2250	II	POISON		None	212	242	25 kg	100 kg	1,3	1,3	25, 40, 95
	Dichlorophenyltrichlorosilane	8	UN1766	II	CORROSIVE	B2, B6, N16, N26, N34, T8, T26.	None	202	242	Forbidden	30 L	1	1	40
	Dichloropropane, see Propylene dichloride													
	1,3-Dichloropropanol-2	6.1	UN2750	II	POISON	T8	None	202	243	5 L	60 L	1,3	1,3	12, 40, 95
E	Dichloropropene (*RQ-5000/2270*)	3	UN2047	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1,3	
	Dichloropropene and propylene dichloride mixture, see Propylene dichloride.													
DE	2,2-Dichloropropionic acid (*RQ-5000/2270*)	8	NA1760	II	CORROSIVE	B2	154	202	242	1 L	30 L	1,2	1,2	
	Dichlorosilane	2.3	UN2189	II	POISON GAS, FLAMMABLE GAS.	B13, B14, B31, 10.	None	304	244	Forbidden	Forbidden	1	5	40, 95
	Dichlorotetrafluoroethane	2.2	UN1958		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
	3.5 Dichloro-2,4,6 trifluoropyridine	6.1	NA2810	I	POISON	B14, B32, 10.		227	244	Forbidden	Forbidden	1	1,3	40, 95
	Dichlorovinylchloroarsine	Forbidden												
DE	Dichlorvos (*RQ-10/4.54*)	6.1	NA2783	III	KEEP AWAY FROM FOOD.		153	213	241	100 kg	200 kg	1,2	1,2	

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Dicumyl peroxide, *technically pure, or* Dicumyl peroxide *with inert solid.*	5.2	UN2121	II	ORGANIC PEROXIDE.	B9, B20	152	225	243	10 kg	25 kg	1	5	12, 40
	Dicycloheptadiene *see* Norbornadiene													
AW	Dicyclohexylamine	8	UN2565	III	CORROSIVE	T8	154	203	241	5 L	60 L	1,2	1,2	
	Dicyclohexylammonium nitrite	6.1	UN2687	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Dicyclohexyl peroxydicarbonate, *not more than 91 per cent with water.*	5.2	UN2153	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Dicyclohexyl peroxydicarbonate, *technically pure.*	5.2	UN2152	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Dicyclopentadiene	3	UN2048	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1,3	
	Didecanoyl peroxide, *technically pure*	5.2	UN2120	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	2,2-Di-(4,4-di-tert-butylperoxycyclohexyl) propane, more than 42 per cent with inert solid.	Forbidden												
	2,2-Di-(4,4-di-tert-butylperoxycyclohexyl) propane, *not more than 42 per cent with inert solid.*	5.2	UN2168	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	Di-2,4-dichlorobenzoyl peroxide, more than 75 per cent with water.	Forbidden												
	Di-2,4-dichlorobenzoyl peroxide, *not more than 52 per cent as a paste.*	5.2	UN2138	II	ORGANIC PEROXIDE.		152	225	None	10 kg	25 kg	1	5	12, 40
	Di-2,4-dichlorobenzoyl peroxide, *not more than 52 per cent in solution.*	5.2	UN2139	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	Di-2,4-dichlorobenzoyl peroxide, *not more than 75 per cent with watr.*	5.2	UN2137	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	1,2-Di-(dimethylamino) ethane	3	UN2372	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Didymium nitrate	5.1	UN1465	III	OXIDIZER	A1	152	213	240	25 kg	100 kg	1,2	1,2	
DE	Dieldrin (*RQ-1/0.454*)	6.1	NA2761	II	POISON		None	212	242	0.5 kg	5 kg	1,2	1,2	
D	Diesel fuel	3	NA1202	III	None		150	203	241	60 L	220 L	1,3	1,3	
	Diethanol nitrosamine dinitrate (dry)	Forbidden												
	Diethoxymethane	3	UN2373	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	5	12
	2,5-Diethoxy-4-morpholinobenzenediazonium zinc chloride.	4.1	UN3036	II	FLAMMABLE SOLID.		None	212	None	Forbidden	Forbidden	1	5	25
	3,3-Diethoxypropene	3	UN2374	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
E	Diethylamine (*RQ-1000/454*)	3	UN1154	II	FLAMMABLE LIQUID.	N34, T8	150	202	242	Forbidden	60 L	1,3	5	12, 40
	Diethylaminoethanol	3	UN2686	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
AW	Diethylaminopropylamine	8	UN2684	III	CORROSIVE, FLAMMABLE LIQUID.	B1, B2, T8.	154	203	243	5 L	60 L	1,2	1,2	

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	N,N-Diethyl aniline	6.1	UN2432	III	KEEP AWAY FROM FOOD.	T2	153	203	241	60 L	220 L	1,2	1,2	34
	Diethylbenzene	3	UN2049	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1,3	40
	Diethyl carbonate	3	UN2366	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1,3	
	Diethyl cellosolve, see Ethylene glycol diethyl ether.													
	Diethyldichlorosilane	8	UN1767	II	CORROSIVE, FLAMMABLE LIQUID.	B6, N16, N26, N34, T8, T26.	None	202	243	Forbidden	30 L	1	1	21, 40, 77
	Diethylene glycol dinitrate	Forbidden												
	Diethylene glycol dinitrate, desensitized *with not less than 25 percent non-volatile water-insoluble phlegmatizer, by weight.*	1.1D	UN0075											
	Diethylenetriamine	8	UN2079	II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1,2	1,2	26, 32, 40, 71
	Diethyl ether	3	UN1155	I	FLAMMABLE LIQUID.	T21	150	201	243	Forbidden	30 L	1,3	5	12, 40
	N,N-Diethylethylene diamine	8	UN2685	II	CORROSIVE, FLAMMABLE LIQUID.	T8	None	202	243	1 L	30 L	1,3	1,3	12, 21
	Diethylgold bromide	Forbidden												
	Di-2-ethylhexyl peroxydicarbonate, *not more than 77 per cent in so ution.*	5.2	UN2123	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Di-2-ethylhexyl peroxydicarbonate, *not more than 32 per cent, stab e dispersion in water.*	5.2	UN2960	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Di-2-ethylhexyl peroxydicarbonate, *technically pure.*	5.2	UN2122	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Di-2-ethylhexyl phosphoric acid, see Diisooctyl acid phosphate.													
	Diethyl ketone	3	UN1156	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Diethyl peroxydicarbonate, more than 27 per cent in solution.	Forbidden												
	Diethyl peroxydicarbonate, *not more than 27 per cent in solution.*	5.2	UN2175	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Diethyl sulfate	6.1	UN1594	II	POISON	T14	None	202	243	5 L	60 L	1	1	95
	Diethyl sulfide	3	UN2375	II	FLAMMABLE LIQUID, POISON.	T14	None	202	243	1 L	60 L	1,3	5	12, 13, 95
	Diethylthiophosphoryl chloride	8	UN2751	II	CORROSIVE	B2, T8	None	202	242	1 L	30 L	1	5	12, 21, 40

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Diethylzinc	4.2	UN1366	I	SPONTANEOUSLY COMBUSTIBLE.	B11, T28, T40.	None	181	244	Forbidden	Forbidden	1	5	18
	Difluorochloroethanes, *see* Chlorodifluoroethanes.													
	Difluoroethane (*R-152a*)	2.1	UN1030		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	1,1-Difluoroethylene	2.1	UN1959		FLAMMABLE GAS.	B13	306	304	244	Forbidden	150 kg	1,3	5	40, 85
	Difluorophosphoric acid, anhydrous	8	UN1768	II	CORROSIVE	B2, N5, N11, N16, N26, N34, T9, T27.	None	202	242	Forbidden	30 L	1,2	1,2	40
	2,2-Dihydroperoxy propane, *not more than 25 per cent with inert organic solid.*	5.2	UN2178	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	2,3-Dihydropyran	3	UN2376	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	
	Di-(1-hydroxycyclohexyl) peroxide, *technically pure.*	5.2	UN2148	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	1,8-Dihydroxy-2,4,5,7-tetranitroanthraquinone (chrysamminic acid).	Forbidden												
	Di-(1-hydroxytetrazole) (dry)	Forbidden												
	Diiodoacetylene	Forbidden												
	Diisobutylamine	3	UN2361	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1,3	
	Diisobutylene, isomeric compounds	3	UN2050	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Diisobutyl ketone	3	UN1157	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Diisobutyryl peroxide, *not more than 52 per cent in solution.*	5.2	UN2182	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Diisooctyl acid phosphate	8	UN1902	III	CORROSIVE	T7	154	203	241	5 L	60 L	1,2	1,2	
	Diisopropylamine	3	UN1158	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Diisopropylbenzene hydroperoxide, *see* Isopropylcumyl hydroperoxide, *etc.*.													
	Diisopropyl ether	3	UN1159	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	5	12, 40
	Diisopropyl peroxydicarbonate *or* Isopropyl peroxydicarbonate, *technically pure.*	5.2	UN2133	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Diisopropyl peroxydicarbonate *or* Isopropyl peroxydicarbonate, *not more than 52 per cent in solution.*	5.2	UN2134	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Diisotridecyl peroxydicarbonate, *technically pure.*	5.2	UN2889	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Diketene, inhibited	3	UN2521	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1,3	
	Dilauroyl peroxide (Lauroyl peroxide), *not more than 42 per cent, stable dispersion, in water.*	5.2	UN2893	II	ORGANIC PEROXIDE.		152	225	None	10 L	25 L	1	5	12, 40
	Dilauroyl peroxide (Lauroyl peroxide), *technically pure.*	5.2	UN2124	II	ORGANIC PEROXIDE.		152	225	None	10 kg	25 kg	1	5	12, 40
	1,1-Dimethoxyethane	3	UN2377	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	12
	1,2-Dimethoxyethane	3	UN2252	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	
E	Dimethylamine, anhydrous (*RQ-1000/454*)	2.3	UN1032	II	POISON GAS, FLAMMABLE GAS.	B14, B33, 10.	None	304	314, 315	Forbidden	Forbidden	1,3	5	40, 85
E	Dimethylamine solution (*RQ-1000/454*)	3	UN1160	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	12
	2-Dimethylaminoacetonitrile	3	UN2378	II	FLAMMABLE LIQUID, POISON.	T8	None	202	243	1 L	60 L	1,3	1	40
	4-Dimethylamino-6-(2-dimethylaminoethoxy) toluene-2-diazonium zinc chloride.	4.1	UN3039	II	FLAMMABLE SOLID.		None	212	None	Forbidden	Forbidden	1	5	2
	Dimethylaminoethyl methacrylate	6.1	UN2522	II	POISON	T8	None	202	243	5 L	60 L	1,2	1	40, 95
	N,N-Dimethylaniline	6.1	UN2253	II	POISON	T8	None	202	243	5 L	60 L	1,3	1,3	95
	Di-(2-methylbenzoyl) peroxide, *not more than 85 per cent with water.*	5.2	UN2593	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	2,3-Dimethylbutane	3	UN2457	II	FLAMMABLE LIQUID.	T13	150	202	242	5 L	60 L	1,3	5	12
	1,3-Dimethylbutylamine	3	UN2379	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Dimethylcarbamoyl chloride	8	UN2262	II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1,2	1,2	40
	Dimethyl carbonate	3	UN1161	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Dimethyl chlorothiophosphate, see Corrosive liquid, poisonous, n.o.s.													
	Dimethylcyclohexanes	3	UN2263	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Dimethylcyclohexylamine	8	UN2264	II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1,3	1,3	12, 21, 40
	2,5-Dimethyl-2,5-di-(benzoylperoxy) hexane, *not more than 82 per cent with inert solid.*	5.2	UN2173	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	2,5-Dimethyl-2,5-di-(benzoylperoxy) hexane, *not more than 82 per cent with water.*	5.2	UN2959	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	2,5-Dimethyl-2,5-di-(benzoylperoxy) hexane, *technically pure.*	5.2	UN2172	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	2,5-Dimethyl-2,5-di(tert-butylperoxy) hexane, *not more than 52 per cent with inert solid.*	5.2	UN2156	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	2,5-Dimethyl-2,5-di-3 (tert-butylperoxy) hexane, *technically pure.*	5.2	UN2155	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	2,5-Dimethyl-2,5-di(tert-butylperoxy) hexyne-3, *not more than 52 per cent with inert solid.*	5.2	UN2159	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	2,5-Dimethyl-2,5-di(tert-butylperoxy)*technically pure.*	5.2	UN2158	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Dimethyldichlorosilane	3	UN1162	I	FLAMMABLE LIQUID, POISON, CORROSIVE.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,3	1	40
	Dimethyldiethoxysilane	3	UN2380	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	2,5-Dimethyl-2,5-di(2-ethylhexanoylperoxy) hexane, *technically pure.*	5.2	UN2157	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	2,5-Dimethyl-2,5-dihydroperoxy hexane *or* Dimethylhexane dihydroperoxide, *not more than 82 per cent with water.*	5.2	UN2174	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	2,5-Dimethyl-2,5-dihydroperoxy hexane, more than 82 per cent with water.	Forbidden												
	Dimethyldioxanes	3	UN2707	II	FLAMMABLE LIQUID.	T8, T31	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1,3	
	Dimethyl disulfide	3	UN2381	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	40
	2,5-Dimethyl-2,5-di-(3,5,5-trimethyl hexanoylperoxy)-hexane, *or*2,5-Dimethyl-2,5-di(isononanoylperoxy)-hexane *not more than 77% in solution .*	5.2	UN3060	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	
	Dimethylethanolamine	3	UN2051	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Dimethyl ether	2.1	UN1033		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	N,N-Dimethylformamide	3	UN2265	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Dimethylhexane dihydroperoxide, see 2,5-Dimethyl2,5-dihydroperoxy hexane, *etc.*.													
	Dimethylhydrazine, symmetrical	3	UN2382	I	FLAMMABLE LIQUID, POISON.	B14, B32, N15, N26, 10.	None	227	244	Forbidden	Forbidden	1,3	5	12, 40, 95
	Dimethylhydrazine, unsymmetrical	3	UN1163	I	FLAMMABLE LIQUID, POISON, CORROSIVE.	B14, B32, N15, N26, 10.	None	227	244	Forbidden	Forbidden	1,3	5	40, 61, 74, 95

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Dimethyl magnesium	4.2	UN1368	I	SPONTANEOUSLY COMBUSTIBLE.		None	181	244	Forbidden	Forbidden	1	5	18
D	Dimethyl phosphorochloridothioate	6.1	NA2927	I	POISON, CORROSIVE.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,2	1	20, 95
	2,2-Dimethylpropane *other than pentane or isopentane.*	2.1	UN2044		FLAMMABLE GAS.	B13	306	304	244	Forbidden	150 kg	1,3	1	40, 85
	Dimethyl-N-propylamine	3	UN2266	II	FLAMMABLE LIQUID, CORROSIVE.	T14, T26	None	202	243	1 L	5 L	1,3	1	40
	Dimethyl sulfate	6.1	UN1595	I	POISON, CORROSIVE.	T18, T26	None	201	243	Forbidden	30 L	1	5	40, 95
	Dimethyl sulfide	3	UN1164	I	FLAMMABLE LIQUID.	T14	None	201	243	Forbidden	30 L	1,3	5	12
AW	Dimethyl thiophosphoryl chloride	8	UN2267	III	CORROSIVE	T7	154	203	241	5 L	60 L	1,2	1	85, 25
	Dimethylzinc	4.2	UN1370	I	SPONTANEOUSLY COMBUSTIBLE.	B11, B16, T28, T29, T40.	None	181	244	Forbidden	Forbidden	1	5	18
	Dimyristyl peroxydicarbonate, *not more than 22 per cent, stable dispersion, in water.*	5.2	UN2892	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Dimyristyl peroxydicarbonate, *technically pure.*	5.2	UN2595	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Di-(1-naphthoyl) peroxide	Forbidden												
	Dinitroanilines	6.1	UN1596	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	95
E	Dinitrobenzenes (*RQ-1000/454*) (*poisonous liquid*).	6.1	UN1597	II	POISON	T14, 11	None	202	243	5 L	60 L	1,2	1,2	95
E	Dinitrobenzenes (*RQ-1000/454*) (*poisonous solid*).	6.1	UN1597	II	POISON	11	None	212	242	25 kg	100 kg	1,2	1,2	95
	Dinitrochlorobenzene, see Chlorodinitrobenzene.													
	Dinitro-o-cresol	6.1	UN1598	II	POISON	T14	None	212	242	25 kg	100 kg	1,2	1,2	95
	Dinitro-7,8-dimethylglycoluril (dry)	Forbidden												
	1,3-Dinitro-5,5-dimethyl hydantoin	Forbidden												
	1,3-Dinitro-4,5-dinitrosobenzene	Forbidden												
	1,2-Dinitroethane	Forbidden												
	1,1-Dinitroethane (dry)	Forbidden												
	Dinitroglycoluril	Forbidden												
	Dinitromethane	Forbidden												

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Dinitrophenolates (*alkali metals*), *dry or wetted with less than 15 per cent water, by weight.*	1.3C	UN0077											
	Dinitrophenolates, wetted *with not less than 15 per cent water, by weight.*	4.1	UN1321	I	FLAMMABLE SOLID, POISON.	A19, A20, N2, N34, N41.	None	211	None	1 kg	15 kg	1,3	5	36
E	Dinitrophenol, *dry or wetted with less than 15 per cent water, by weight(RQ-1000/454).*	1.1D	UN0076											
E	Dinitrophenol solutions (*RQ-1000/454*)	6.1	UN1599	II	POISON	T8	None	202	243	5 L	60 L	1,2	5	23, 36, 95
E	Dinitrophenol, wetted *with not less than 15 per cent water, by weight(RQ-1000/454).*	4.1	UN1320	I	FLAMMABLE SOLID, POISON.	A19, A20, N2, N34, N41.	None	211	None	1 kg	15 kg	1,3	5	36, 47
	Dinitropropylene glycol	Forbidden												
	Dinitroresorcinol, *dry or wetted with less than 15 per cent water, by weight.*	1.1D	UN0078											
	4,6-Dinitroresorcinol (heavy metal salts of) (dry).	Forbidden												
	2,4-Dinitroresorcinol (heavy metal salts of) (dry).	Forbidden												
	Dinitroresorcinol, wetted *with not less than 15 per cent water, by weight.*	4.1	UN1322	I	FLAMMABLE SOLID.	A19, A20, N2, N34, N41.	None	211	None	1 kg	15 kg	1,3	5	36
	3,5-Dinitrosalicylic acid (lead salt) (dry)	Forbidden												
	Dinitrosobenzene	1.3C	UN0406											
	Dinitrosobenzylamidine and salts of (dry)	Forbidden												
	N,N'-Dinitroso-N,N'-dimethyl terephthalamide.	4.1	UN2973	II	FLAMMABLE SOLID.		None	212	None	Forbidden	Forbidden	1	5	12, 25, 48, 52, 53
	N,N'-Dinitrosopentamethylenetetramine	4.1	UN2972	II	FLAMMABLE SOLID.		None	212	None	Forbidden	Forbidden	1	5	12, 25, 48, 52, 53
	2,2-Dinitrostilbene	Forbidden												
	1,4-Dinitro-1,1,4,4-tetramethylolbutanetetranitrate (dry).	Forbidden												
DE	Dinitrotoluene, liquid (*RQ-1000/454*)	6.1	NA1600	II	POISON	T14, T38	None	202	243	5 L	60 L	1,2	1,2	
				III	KEEP AWAY FROM FOOD.	T14, T38	153	203	241	60 L	220 L	1,2	1,2	
E	Dinitrotoluenes, molten (*RQ-1000/454*)	6.1	UN1600	II	POISON	T14, T38	None	202	243	Forbidden	Forbidden	1,2	1,2	95
E	Dinitrotoluenes, solid (*RQ-1000/454*)	6.1	UN2038	II	POISON	T8, T38	None	212	242	25 kg	100 kg	1,2	1,2	95
	2,4-Dinitro-1,3,5-trimethylbenzene	Forbidden												

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Di-(beta-nitroxyethyl) ammonium nitrate	Forbidden												
	a,a'-Di-(nitroxy) methylether	Forbidden												
	1,9-Dinitroxy pentamethylene-2,4, 6,8-tetramine (dry).	Forbidden												
	Di-n-nonanoyl peroxide, *technically pure*	5.2	UN2130	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Di-n-octanoyl peroxide, *technically pure*	5.2	UN2129	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Dioxane	3	UN1165	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Dioxolane	3	UN1166	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	40
	Dipentene	3	UN2052	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Diperoxy azelaic acid *not more than 27 per cent with not less than 13 per cent azelaic acid and not less than 53 per cent sodium sulfate.*	5.2	UN2958	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Diperoxy dodecane diacid, *not more than 42% with nor less than 56% sodium sulfate.*	5.2	UN3063	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	2
	Di-(2 Phenoxyethyl)-peroxy dicarbonate, *not more than 85% with water.*	5.2	UN3059	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	2
	Di-(2 phenoxyethyl)-peroxy dicarbonate, *technically pure.*	5.2	UN3058	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	2
	Diphenylamine chlorcarsine (*DM*)	6.1	UN1698	II	POISON		None	212	None	Forbidden	35 kg	1	5	40, 95
	Diphenylchloroarsine	6.1	UN1699	I	POISON	B14, B32, N2, N33, N34, 10.	None	211	244	Forbidden	Forbidden	1	5	40, 95
	Diphenyldichlorosilane	8	UN1769	II	CORROSIVE	B2, N16, N26, N34, T8, T26.	None	202	244	Forbidden	30 L	1	1	40
	Diphenylmethane-4,4'diisocyanate	6.1	UN2489	III	KEEP AWAY FROM FOOD.	T8	153	203	241	60 L	220 L	1,2	1,2	34, 48
	Diphenylmethyl bromide	8	UN1770	II	CORROSIVE		154	212	240	15 kg	50 kg	1	5	40
	Diphenyloxide-4,4'disulfohydrazide	4.1	UN2951	II	FLAMMABLE SOLID.		None	212	None	15 kg	50 kg	1,3	1	12, 25, 48, 52, 53, 85
	Dipicrylamine, *see* Hexanitrodiphenylamine													
	Dipicryl sulfide, *dry or wetted with less than 10 per cent water, by weight.*	1.1D	UN0401											
	Dipicryl sulfide, wetted *with not less than 10 per cent water, by weight.*	4.1	UN2852	I	FLAMMABLE SOLID.	A2, N15, N34, N41.	None	211	None	Forbidden	0.5 kg	1	5	

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Dipropionyl peroxide *or* Propionyl peroxide, *not more than 28 per cent in solution*	5.2	UN2132	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Dipropionyl peroxide, more than 28 per cent in solution.	Forbidden												
	Dipropylamine	3	UN2383	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	4-Dipropylaminobenzenediazonium zinc chloride.	4.1	UN3034	II	FLAMMABLE SOLID.		None	212	None	Forbidden	Forbidden	1	5	25
	Dipropyl ether	3	UN2384	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	5	12
	Dipropylketone	3	UN2710	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Di-n-propyl peroxydicarbonate, *technically pure.*	5.2	UN2176	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
DE	Diquat (*RQ-1000/454*)	ORM-E	NA2781	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Disinfectants, corrosive liquid, n.o.s.	8	UN1903	II	CORROSIVE	B2	154	202	242	1 L	30 L	1,2	1,2	
				III	CORROSIVE		154	203	241	5 L	60 L	1,2	1,2	
	Disinfectants, n.o.s. *poisonous liquid*	6.1	UN1601	I	POISON		None	201	243	1 L	30 L	1,2	1	40, 95
				II	POISON		None	202	243	5 L	60 L	1,2	1,2	40, 95
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34, 40
	Disinfectants, n.o.s. *poisonous solid*	6.1	UN1601	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Dispersant gas, see Compressed *or* liquefied gases, *etc.*.													
	Distearyl peroxydicarbonate, *not more than 85 per cent with stearyl alcohol.*	5.2	UN2592	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	Disuccinic acid peroxide or Succinic acid peroxide, *technically pure.*	5.2	UN2135	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Disuccinic acid peroxide, *not more than 72 per cent, wetted with water.*	5.2	UN2962	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
DE	Disulfoton (*RQ-1/0.454*)	6.1	NA2783	II	POISON		None	202	243	5 L	60 L	1,2	1	
	Dithiocarbamate pesticides, liquid, flammable, toxic, n.o.s., *flash point less than 23deg C.*	3	UN2772	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	5	
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	
	Dithiocarbamate pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23deg C.*	6.1	UN3005	I	POISON, FLAMMABLE LIQUID.	T42	None	201	243	1 L	30 L	1	1	21, 40, 95
				II	POISON, FLAMMABLE LIQUID.	T14	None	202	243	5 L	60 L	1,3	1	21, 40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	241	60 L	220 L	1,2	1	21, 34, 40
	Dithiocarbamate pesticides, liquid, toxic, n.o.s..	6.1	UN3006	I	POISON		None	201	243	1 L	30 L	1	1	40, 95

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	.....	.....	.....	II	POISON	.....	None	202	243	5 L	60 L	1,2	1	40, 95
	.....	.....	.....	III	KEEP AWAY FROM FOOD.	.....	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Dithiocarbamate pesticides, solid, toxic, n.o.s.	6.1	UN2771	I	POISON	.....	None	211	242	5 kg	50 kg	1,2	1,2	40, 95
	.....	.....	.....	II	POISON	.....	None	212	242	25 kg	100 kg	1,2	1,2	40, 95
	.....	.....	.....	III	KEEP AWAY FROM FOOD.	.....	153	213	240	100 kg	200 kg	1,2	1,2	34, 40
	Di-(3,5,5-trimethyl-1,2-dioxolanyl-3) peroxide, *not more than 50 per cent as a paste, with phlegmatizer.*	5.2	UN2597	II	ORGANIC PEROXIDE.	.....	None	225	None	Forbidden	Forbidden	1	5	20, 40
	Di-(3,5,5-trimethylhexanoyl) peroxide, *in solution, or* Di-(3,5,5-trimethylhexanoyl) peroxide, *technically pure.*	5.2	UN2128	II	ORGANIC PEROXIDE.	.....	None	225	None	Forbidden	Forbidden	1	5	20, 40
DE	Diuron (*RQ-100/45.4*)	ORM-E	NA2767	III	None	.....	156	213	240	No limit	No limit	1,2	1,2	
	Divinyl ether, inhibited	3	UN1167	II	FLAMMABLE LIQUID.	N15, T14	None	202	241	Forbidden	60 L	1,3	5	12, 40
DE	Dodecylbenzenesulfonic acid (*RQ-1000/454*).	8	NA2584	II	CORROSIVE	B2	154	202	242	1 L	30 L	1,2	1,2	
	Dodecyltrichlorosilane	8	UN1771	II	CORROSIVE	B2, B6, N16, N26, N34, T8, T26.	None	202	242	Forbidden	30 L	1	1	40
	Driers, paint *or* varnish, liquid, n.o.s.	3	UN1168	II	FLAMMABLE LIQUID.	T8, T31	150	173	242	5 L	60 L	1,3	1	
	.....	.....	.....	III	FLAMMABLE LIQUID.	B1, T7, T30.	150	173	242	60 L	220 L	1,3	1,3	
	Driers, paint *or* varnish, solid, n.o.s.	4.1	UN1371	III	FLAMMABLE SOLID.	A1, A19, B16.	151	213	242	25 kg	100 kg	1,3	1,3	
	Dry ice, *see* Carbon dioxide, solid	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Dyes, n.o.s. *or* Dye intermediates, n.o.s., *corrosive liquid.*	8	UN2801	II	CORROSIVE	B2, T14, 11.	154	202	242	1 L	30 L	1,2	1,2	23
	.....	.....	.....	III	CORROSIVE	T14, 11	154	203	241	5 L	60 L	1,2	1,2	23
	Dyes, n.o.s. *or* Dye intermediates, n.o.s. *poisonous liquid.*	6.1	UN1602	I	POISON	.....	None	201	243	1 L	30 L	1,2	1	23, 95
	.....	.....	.....	II	POISON	.....	None	202	243	5 L	60 L	1,2	1,2	23, 95
	.....	.....	.....	III	KEEP AWAY FROM FOOD.	.....	153	203	241	60 L	220	1,2	1,2	34
	Dyes, n.o.s. *or* Dye intermediates, n.o.s. *poisonous solid.*	6.1	UN1602	I	POISON	.....	None	211	242	5 kg	50 kg	1,2	1	95
	.....	.....	.....	II	POISON	.....	None	212	242	25 kg	100 kg	1,2	1,2	95
	.....	.....	.....	II	KEEP AWAY FROM FOOD.	.....	153	213	240	100 kg	200 kg	1,2	1,2	34
	Dyes, n.o.s. *or* Dye intermediates, n.o.s. *corrosive solid.*	8	UN2801	II	CORROSIVE	11	154	212	242	15 kg	50 kg	1,2	1,2	
	.....	.....	.....	III	CORROSIVE	11	154	213	240	25 kg	100 kg	1,2	1,2	
	Dynamite, see Explosive, blasting, type A	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	EDTA. *See* Ethylenediaminetetraacetic acid.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Electrolyte (acid or alkali) for batteries, see Battery fluid, acid *or* Battery fluid, alkali.													
DE	Endosulfan (*RQ-1/0.454*)	6.1	NA2761	II	POISON		None	212	242	0.5 kg	5 kg	1,2	1,2	
DE	Endosulfan mixture, liquid (*RQ-1/0.454*)	6.1	NA2761	II	POISON		None	202	243	5 L	60 L	1,2	1	
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	
DE	Endrin (*RQ-1/0.454*)	6.1	NA2761	II	POISON		None	212	242	0.5 kg	5 kg	1,2	1,2	
DE	Endrin mixture, liquid (*RQ-1/0.454*)	6.1	NA2761	II	POISON		None	202	243	5 L	60 L	1,2	1	
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	
	Engines, internal combustion, *see* Vehicle, self-propelled.													
	Engine starting fluid, *with flammable gas*	2.1	UN1960		FLAMMABLE GAS.	B13	306	304	244	Forbidden	150 kg	1,3	5	40, 85
	Epibromohydrin	6.1	UN2558	I	POISON		None	201	243	Forbidden	30 L	1	5	23, 25, 40, 95
E	Epichlorohydrin (*RQ-1000/454*)	6.1	UN2023	I	POISON	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,2	1,2	23, 40, 95
	1,2-Epoxy-3-ethoxypropane	3	UN2752	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
I	Eradicators, paint *or* grease, liquid	3	UN1850	I	FLAMMABLE LIQUID.		150	201	243	1 L	30 L	1,3	5	
				II	FLAMMABLE LIQUID.		150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1	150	203	242	60 L	220 L	1,2	1,3	
I	Eradicators, paint *or* grease, liquid	6.1	UN1850	II	POISON		None	202	243	5 L	60 L	1,2	1	
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1	
I	Eradicators, paint *or* grease, liquid	8	UN1850	II	CORROSIVE	B2	154	202	242	1 L	30 L	1,2	1	
				III	CORROSIVE		154	203	241	5 L	60 L	1,2	1	
	Etching acid, liquid, n.o.s., see Hydrofluoric acid, solution.													
	Ethane, compressed	2.1	UN1035		FLAMMABLE GAS.	B13	306	304	244	Forbidden	150 kg	1,3	5	40, 85
D	Ethane-Propane mixture, refrigerated liquid	2.1	NA1961		FLAMMABLE GAS.	B13	None	316	244	Forbidden	Forbidden	1	5	40
	Ethane, refrigerated liquid	2.1	UN1961		FLAMMABLE GAS.	B13	None	316	244	Forbidden	Forbidden	1	5	40
	Ethanolamine *or* Ethanolamine solutions	8	UN2491	III	CORROSIVE	T7	154	203	241	5 L	60 L	1,2	1,2	
	Ethanol amine dinitrate	Forbidden												
	Ethanol (Ethyl alcohol) *or* Ethanol (Ethyl alcohol) solutions, *including* Alcoholic beverages.	3	UN1170	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Ether, see Diethyl ether													
DE	Ethion (*RQ-10/4.54*)	6.1	NA2783	II	POISON		None	202	243	Forbidden	1 L	1,2	1	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Ethyl acetate	3	UN1173	II	FLAMMABLE LIQUID.	T2	150	202	242	5 L	60 L	1,3	1	
	Ethyl acetylene, inhibited	2.1	UN2452		FLAMMABLE GAS.	B13	None	304	244	Forbidden	150 kg	1	5	40
	Ethyl acrylate, inhibited	3	UN1917	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	40
	Ethyl alcohol, *see* Ethanol													
	Ethyl aldehyde, see Acetaldehyde													
E	Ethylamine (*RQ-1000/454*)	2.1	UN1036		FLAMMABLE GAS.	B13	None	321	244	Forbidden	150 kg	1,3	5	40, 85
	Ethylamine, aqueous solution *with not less than 50 per cent but not more than 70 per cent ethylamine.*	3	UN2270	II	FLAMMABLE LIQUID.	N15, T14	150	202	242	5 L	60 L	1,3	5	12, 40
	Ethyl amyl ketone	3	UN2271	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	N-Ethylaniline	6.1	UN2272	III	KEEP AWAY FROM FOOD.	T2	153	203	241	60 L	220 L	1,2	1,2	26, 34
	2-Ethylaniline	6.1	UN2273	III	KEEP AWAY FROM FOOD.	T2	153	203	241	60 L	220 L	1,2	1,2	26, 34
E	Ethylbenzene (*RQ-1000/454*)	3	UN1175	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	N-Ethyl-N-benzylaniline	6.1	UN2274	III	KEEP AWAY FROM FOOD.	T2	153	203	241	60 L	220 L	1,2	1,2	34
	N-Ethylbenzyltoluidines	6.1	UN2753	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,3	1,3	12, 34
	Ethyl borate	3	UN1176	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Ethyl bromide	6.1	UN1891	II	POISON	T17	None	202	243	5 L	60 L	1,3	1	40, 48, 95
	Ethyl bromoacetate	6.1	UN1603	II	POISON	T14	None	202	243	Forbidden	1 L	1	5	23, 40, 95
	2-Ethylbutanol	3	UN2275	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Ethylbutyl acetate	3	UN1177	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Ethyl butyl ether	3	UN1179	II	FLAMMABLE LIQUID.	B1, T1	150	202	242	5 L	60 L	1,3	1	
	2-Ethylbutyraldehyde	3	UN1178	II	FLAMMABLE LIQUID.	B1, T1	150	202	242	5 L	60 L	1,3	1	
	Ethyl butyrate	3	UN1180	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1,3	
	Ethyl chloride	2.3	UN1037		POISON GAS, FLAMMABLE GAS.	B13, B33, 10.	None	322	244	Forbidden	Forbidden	1,3	5	40, 85
	Ethyl chloroacetate	6.1	UN1181	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	23, 40, 48, 95

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Ethyl chloroformate	3	UN1182	I	FLAMMABLE LIQUID, POISON, CORROSIVE.	B14, B32, N1, N11, N26, N34, 10.	None	227	244	Forbidden	Forbidden	1,3	5	40
	Ethyl-2-chloropropionate	3	UN2935	III	FLAMMABLE LIQUID.	B1	150	203	242	60 L	220 L	1,3	1,3	
	Ethyl chlorothioformate	3	UN2826	I	FLAMMABLE LIQUID, CORROSIVE.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1	1,3	21, 40, 95
	Ethyl crotonate	3	UN1862	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Ethyl cyanoacetate	6.1	UN2666	III	KEEP AWAY FROM FOOD.	T8	153	203	241	60 L	220 L	1,2	1,2	26, 34
	Ethyl-3,3-di-(tert-butylperoxy) butyrate, *not more than 50 per cent with inert inorganic solid.*	5.2	UN2598	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	Ethyl-3,3-di-(tert-butylperoxy) butyrate, *not more than 77 per cent in solution.*	5.2	UN2185	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	Ethyl-3,3-di-(tert-butylperoxy) *technically pure.*	5.2	UN2184	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Ethyldichloroarsine	6.1	UN1892	I	POISON	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1	5	40, 95
	Ethyldichlorosilane	4.3	UN1183	I	DANGEROUS WHEN WET, CORROSIVE, POISON, FLAMMABLE LIQUID.	A2, N1, N15, N26, N34, T18, T26.	None	201	244	Forbidden	1 L	1	1	40
	Ethylene chlorohydrin	6.1	UN1135	I	POISON	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,2	1,2	23, 40, 48, 95
	Ethylene, compressed	2.1	UN1962		FLAMMABLE GAS.	B13	306	304	244	Forbidden	150 kg	1,3	5	40, 85
	Ethylenediamine (*RQ-1000/454*)	8	UN1604	II	CORROSIVE, FLAMMABLE LIQUID.	T14	154	202	243	1 L	30 L	1,3	1,3	21, 40
	Ethylene diamine diperchlorate	Forbidden												
DE	Ethylenediaminetetraacetic acid (*RQ-5000/2270*).	ORM-E	NA9117	III	None		156	213	240	No limit	No limit	1,2	1,2	
E	Ethylene dibromide (*RQ-1000/454*)	6.1	UN1605	I	POISON	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,2	1,2	40, 95
	Ethylene dibromide and methyl bromide liquid mixtures, see Methyl bromide and ethylene dibromide, liquid mixtures.													
E	Ethylene dichloride (*RQ-5000/2270*)	3	UN1184	II	FLAMMABLE LIQUID, POISON.	T14	None	202	243	1 L	60 L	1,3	1	

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Ethylene glycol diethyl ether	3	UN1153	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Ethylene glycol dinitrate	Forbidden												
	Ethylene glycol monobutyl ether	6.1	UN2369	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,3	1,3	22, 25, 40, 34
	Ethylene glycol monoethyl ether	3	UN1171	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Ethylene glycol monoethyl ether acetate	3	UN1172	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Ethylene glycol monomethyl ether	3	UN1188	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Ethylene glycol monomethyl ether acetate	3	UN1189	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Ethyleneimine, inhibited	6.1	UN1185	I	POISON, FLAMMABLE LIQUID.	B14, B32, N16, N17, N25, N32, 10.	None	227	244	Forbidden	Forbidden	1,3	1	
	Ethylene oxide and carbon dioxide mixtures, see Carbon dioxide and ethylene oxide mixtures, *etc.*.													
	Ethylene oxide and propylene oxide mixtures, *not more than 30 per cent ethylene oxide.*	3	UN2983	I	FLAMMABLE LIQUID, POISON.	N4, N15, N34, N40.	None	201	243	Forbidden	30 L	1,3	5	12, 40
	Ethylene oxide, *pure or with nitrogen*	2.3	UN1040	II	POISON GAS, FLAMMABLE GAS.	10	None	323	248	Forbidden	Forbidden	1,3	1	40, 85, 95
	Ethylene, refrigerated liquid (*cryogenic liquid*).	2.1	UN1038		FLAMMABLE GAS.		None	316	318, 319	Forbidden	Forbidden	1	5	40, 85
	Ethyl ether, *see* Diethyl ether													
	Ethyl fluoride	2.3	UN2453	II	POISON GAS	B13, B33, 10.	None	304	244	Forbidden	Forbidden	1,3	5	40, 85
	Ethyl formate	3	UN1190	II	FLAMMABLE LIQUID.	T8	150	202	242	1 L	60 L	1,3	5	12
	Ethylhexaldehyde, see Octyl aldehydes *etc.*.													
	2-Ethylhexylamine	8	UN2276	III	CORROSIVE	T2	154	203	241	5 L	60 L	1,3	1,3	21
	2-Ethylhexylchloroformate	6.1	UN2748	II	POISON, CORROSIVE.		None	202	243	5 L	60 L	1,3	1,3	12, 13, 23, 25, 40, 95
	Ethyl hydroperoxide	Forbidden												
	Ethyl isobutyrate	3	UN2385	II	FLAMMABLE LIQUID.		150	202	242	5 L	60 L	1,3	1	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Ethyl isocyanate	3	UN2481	I	FLAMMABLE LIQUID, POISON.	B13, B14, B30, N15, N26, 10.	None	226	244	Forbidden	Forbidden	1	5	12, 40, 48
	Ethyl lactate	3	UN1192	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Ethyl mercaptan	3	UN2363	II	FLAMMABLE LIQUID, POISON.		None	202	243	Forbidden	60 L	1,3	5	12, 13, 34, 35, 40
	Ethyl methacrylate	3	UN2277	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Ethyl methyl ether	2.1	UN1039		FLAMMABLE GAS.	B13	None	324	244	Forbidden	150 kg	1,3	1	25, 40, 85
	Ethyl methyl ketone *or* Methyl ethyl ketone	3	UN1193	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
D	Ethyl nitrate (*nitric ether*)	3	NA1993	II	FLAMMABLE LIQUID.		150	202	None	Forbidden	Forbidden	1,3	1	
	Ethyl nitrite solutions	3	UN1194	I	FLAMMABLE LIQUID, POISON.		None	201	None	Forbidden	Forbidden	1,3	5	12, 40
	Ethyl orthoformate	3	UN2524	II	FLAMMABLE LIQUID.		150	202	242	5 L	60 L	1,3	1,3	
	Ethyl oxalate	6.1	UN2525	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34
	Ethyl perchlorate	Forbidden												
	Ethylphenyldichlorosilane	8	UN2435	II	CORROSIVE	B2, N16, N26, N34, T8, T26.	None	202	242	Forbidden	30 L	1	1	
	Ethyl phosphonothioic dichloride, anhydrous, see Corrosive liquid, n.o.s.													
	Ethyl phosphonous dichloride, anhydrous, see Pyrophoric liquids, n.o.s.													
	Ethyl phosphorodichloridate, see Corrosive liquid, n.o.s.													
	1-Ethyl piperidine	3	UN2386	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Ethyl propionate	3	UN1195	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Ethyl propyl ether	3	UN2615	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	5	12
	Ethyl silicate, see Tetraethyl silicate													
	Ethylsulfuric acid	8	UN2571	II	CORROSIVE	B2, T9, T27.	154	202	242	1 L	30 L	1,2	1	14
	N-Ethyltoluidines	6.1	UN2754	II	POISON	T14	None	202	243	5 L	60 L	1,3	1,3	12, 22, 25, 95

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Ethyltrichlorosilane	3	UN1196	I	FLAMMABLE LIQUID, POISON, CORROSIVE.	B14, B32, N26, N34, 10.	None	226	244	Forbidden	Forbidden	1,3	1	40
D	Etiologic agent, n.o.s.(*see also* Infectious substances, *etc.*).	6.2	NA2814		ETIOLOGIC AGENT.		196	196	None	50ml	4 L	5	5	
	Explosive articles, see Articles, explosive													
	Explosive, blasting, type A	1.1D	UN0081											
	Explosive, blasting, type B	1.1D	UN0082											
	Explosive, blasting, type B	1.5D	UN0331											
	Explosive, blasting, type C	1.1D	UN0083											
	Explosive, blasting, type D	1.1D	UN0084											
	Explosive, blasting, type E	1.1D	UN0241											
	Explosive, blasting, type E	1.5D	UN0332											
	Explosive, forbidden. See Sec. 173.51	Forbidden												
	Explosives, slurry, see Explosive, blasting, type E.													
	Explosive substances, see Substances, explosive.													
	Explosives, water gels, see Explosive, blasting, type E.													
	Extracts, aromatic, liquid	3	UN1169	I	FLAMMABLE LIQUID.	T7, T30	150	201	243	1 L	30 L	1,3	5	
				II	FLAMMABLE LIQUID.	T7, T30	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	T7, T30	150	203	242	60 L	220 L	1,3	1,3	
	Extracts, flavouring, liquid	3	UN1197	I	FLAMMABLE LIQUID.	T7, T30	150	201	243	1 L	30 L	1,3	5	
				II	FLAMMABLE LIQUID.	T7, T30	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	T7, T30	150	203	242	60 L	220 L	1,3	1,3	
	Fabric with animal or vegetable oil. See Fibers *or* fabrics, *etc.*													
DE	Ferric ammonium citrate (*RQ-1000/454*)	ORM-E	NA9118	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Ferric ammonium oxalate (*RQ-1000/454*)	ORM-E	NA9119	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Ferric arsenate	6.1	UN1606	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Ferric arsenite	6.1	UN1607	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
E	Ferric chloride (*RQ-1000/454*)	8	UN1773	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
E	Ferric chloride, solution (*RQ-1000/454*)	8	UN2582	III	CORROSIVE	T8	154	203	241	5 L	60 L	1,2	1,2	
DE	Ferric fluoride (*RQ-100/45.4*)	ORM-E	NA9120	III	None		156	213	240	No limit	No limit	1,2	1,2	
E	Ferric nitrate (*RQ-1000/454*)	5.1	UN1466	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,2	1,2	
DE	Ferric sulfate (*RQ-1000/454*)	ORM-E	NA9121	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Ferrocerium	4.1	UN1323	II	FLAMMABLE SOLID.	A19	151	212	240	15 kg	50 kg	1,3	1,3	

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Ferrosilicon, *with more than 30 per cent but less than 90 per cent silicon.*	4.3	UN1408	III	DANGEROUS WHEN WET, KEEP AWAY FROM FOOD.	A1, A19	None	213	242	25 kg	100 kg	1,3	1,3	13, 40, 85
DE	Ferrous ammonium sulfate (*RQ-1000/454*)	ORM-E	NA9122	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Ferrous arsenate	6.1	UN1608	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
DE	Ferrous chloride, solid (*RQ-100/45.4*)	8	NA1759	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	
DE	Ferrous chloride, solution (*RQ-100/45.4*)	8	NA1760	II	CORROSIVE	B2	154	202	242	1 L	30 L	1,2	1,2	
	Ferrous metal borings, shavings, turnings *or* cuttings *in a form liable to self-heating.*	4.2	UN2793	III	SPONTANEOUSLY COMBUSTIBLE.	A1, A19	None	213	241	25 kg	100 kg	1,2	1,2	
DE	Ferrous sulfate (*RQ-1000/454*)	ORM-E	NA9125	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Fertilizer ammoniating solution *with free ammonia.*	2.2	UN1043		NONFLAMMABLE GAS.	B13	306	304	244	Forbidden	150 kg	1,3	5	40, 85
AIW	Fibers *or* Fabrics, animal *or* vegetable, n.o.s. *with animal or vegetable oil*	4.2	UN1373	III	SPONTANEOUSLY COMBUSTIBLE.		None	213	241	Forbidden	Forbidden	1,3	1,3	
AIW	Fibers, animal *or* vegetable, n.o.s., *burnt, wet or damp.*	4.2	UN1372	III	SPONTANEOUSLY COMBUSTIBLE.		None	213	241	Forbidden	Forbidden	1,3	1,3	
	Films, nitrocellulose base, from which gelatine has been removed; film scrap, see Celluloid scrap.													
	Films, nitrocellulose base, *gelatine coated (except scrap).*	4.1	UN1324	III	FLAMMABLE SOLID.		None	183	None	25 kg	100 kg	1	5	98
	Fire extinguisher charges, *corrosive liquid*	8	UN1774	II	CORROSIVE	N15, N34, N41.	154	202	None	1 L	30 L	1,2	1,2	
	Fire extinguisher charges, expelling, explosive, see Cartridges, power device.													
	Fire extinguishers *with compressed or liquefied gas.*	2.2	UN1044		NONFLAMMABLE GAS.		306	306	None	75 kg	150 kg	1,3	1,3	85
	Firelighters, solid *with flammable liquid*	4.1	UN2623	II	FLAMMABLE SOLID.	A19	None	212	None	15 kg	50 kg	1,3	1,3	
				III	FLAMMABLE SOLID.	A1, A19	None	213	None	25 kg	100 kg	1,3	1,3	
	Fireworks, type A	1.1G	UN0333											
	Fireworks, type B	1.2G	UN0334											
	Fireworks, type C	1.3G	UN0335											
	Fireworks, type D	1.4G	UN0336											
	Fireworks, type D	1.4S	UN0337											
	Fish meal *or* fish scrap, unstabilized	4.2	UN1374	II	SPONTANEOUSLY COMBUSTIBLE.	A1, A19	None	212	241	15 kg	50 kg	1,3	1,3	
ADW	Fish meal *or* fish scrap containing 6% to 12% water.	9	NA9300	III	None	A1	155	213	241	No limit	No limit	1,2	1,2	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Fissile radioactive materials, see Radioactive material, fissile, n.o.s..													
	Flammable compressed gas, see Compressed *or* Liquefied gas, flammable, *etc.*.													
	Flammable compressed gas (small receptacles not fitted with a dispersion device, not refillable), see Receptacles, *etc.*.													
	Flammable gas in lighters, see Lighters for cigars *or* cigarettes, *with flammable gas.*													
I	Flammable liquid preparations n.o.s. *for the purpose of cleaning enamel, lacquer, paint, varnish, etc.; removing, reducing or thinning liqu making products for polishing, vulcanizing or de-icing, or for dressing leather.*	3	UN1142	I	FLAMMABLE LIQUID.	T42	150	201	243	1 L	5 L	1,3	1	
				II	FLAMMABLE LIQUID.	T8, T31	150	202	242	5 L	60 L	1,3	1,3	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1,3	
	Flammable liquids, corrosive, n.o.s.	3	UN2924	I	FLAMMABLE LIQUID, CORROSIVE.	T42	None	201	243	0.5 L	2.5 L	1,3	5	40
				II	FLAMMABLE LIQUID, CORROSIVE.	T15, T26	None	202	243	1 L	5 L	1,3	1	40
				III	FLAMMABLE LIQUID, CORROSIVE.	B1, T15, T26.	150	203	242	5 L	60 L	1,3	1,3	40
	Flammable liquids, n.o.s.	3	UN1993	I	FLAMMABLE LIQUID.	T42	150	201	243	1 L	30 L	1,3	5	
				II	FLAMMABLE LIQUID.	T8, T31	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1,3	
	Flammable liquids, poisonous, n.o.s.	3	UN1992	I	FLAMMABLE LIQUID, POISON.	B38, T42	None	201	243	Forbidden	30 L	1,3	5	40
				II	FLAMMABLE LIQUID, POISON.	T18	None	202	243	1 L	60 L	1,3	1	40
				III	FLAMMABLE LIQUID, KEEP AWAY FROM FOOD.	B1, T18	150	203	242	60 L	220 L	1,3	1,3	40
	Flammable solids, corrosive, n.o.s.	4.1	UN2925	I	FLAMMABLE SOLID, CORROSIVE.	A19	None	211	242	1 kg	15 kg	1	5	40, 74

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
				II	FLAMMABLE SOLID, CORROSIVE.		None	212	242	15 kg	50 kg	1	5	40, 74
				III	FLAMMABLE SOLID, CORROSIVE.	A1	151	213	242	25 kg	100 kg	1	5	
Flammable solids, n.o.s.		4.1	UN1325	II	FLAMMABLE SOLID.		151	212	240	15 kg	50 kg	1,3	1	
				III	FLAMMABLE SOLID.		151	213	240	25 kg	100 kg	1,3	1	
Flammable solids, poisonous, n.o.s.		4.1	UN2926	I	FLAMMABLE SOLID, POISON.	A19	None	211	242	1 kg	15 kg	1,3	5	
				II	FLAMMABLE SOLID, POISON.		None	212	242	15 kg	50 kg	1,3	1	
				III	FLAMMABLE SOLID, POISON.	A1	151	213	242	25 kg	100 kg	1,3	1	
Flares, aerial		1.3G	UN0093											
Flares, aerial		1.4G	UN0403											
Flares, aerial		1.4S	UN0404											
Flares, aerial		1.1G	UN0420											
Flares, aerial		1.2G	UN0421											
Flares, airplane, see Flares, aerial														
Flares, signal, see Cartridges, signal														
Flares, surface (*other than water activated contrivances*).		1.1G	UN0418											
Flares, surface (*other than water activated contrivances*).		1.2G	UN0419											
Flares, surface (*other than water-activated contrivances*).		1.3G	UN0092											
Flares, water-activated, see Contrivances, water-activated, *etc.*.														
Flash powder, in units, see Photo-flash powder, in units.														
Flue dusts, poisonous, see Arsenical dust														
Fluoboric acid		8	UN1775	II	CORROSIVE	B2, B15, N3, N11, N26, N34, T15, T27.	154	202	242	1 L	30 L	1,2	1,2	
Fluoric acid, see Hydrofluoric acid, solution, *etc.*.														
Fluorine, compressed		2.3	UN1045	IA	POISON GAS, OXIDIZER.	10	None	302	245	Forbidden	Forbidden	1	5	40, 43, 95
Fluoroacetic acid		6.1	UN2642	I	POISON		None	211	242	1 kg	15 kg	1,3	1,3	12, 95

Symbols (1)	Hazardous materials descriptions and proper shipping names (2)	Hazard class (3)	Identification numbers (4)	Packing group (5)	Labels (6)	Special provisions (7)	(8) Packaging authorizations (§173.***) Exceptions (8A)	Non-bulk packaging (8B)	Bulk packaging (8C)	(9) Quantity limitations Passenger aircraft or railcar (9A)	Cargo aircraft only (9B)	(10) Vessel stowage requirements Cargo vessel (10A)	Passenger vessel (10B)	Other stowage provisions (10C)
	4-Fluoroaniline	6.1	UN2944	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	23, 34
	2-Fluoroaniline	6.1	UN2941	III	KEEP AWAY FROM FOOD.	T8	153	203	241	60 L	220 L	1,2	1,2	23, 34
	Fluorobenzene	3	UN2387	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	40
	Fluorophosphoric acid anhydrous	8	UN1776	II	CORROSIVE	B2, N3, N11, N26, N34, T9, T27.	None	202	242	1 L	30 L	1,2	1,2	
	Fluorosilicates, n.o.s.	6.1	UN2856	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	26, 34
	Fluorosilicic acid	8	UN1778	II	CORROSIVE	B2, B15, N3, N11, N26, N34, T12, T27.	None	202	242	1 L	30 L	1,2	1,2	
	Fluorosulfonic acid	8	UN1777	I	CORROSIVE	B41, B4, B6, N1, N3, N11, N26, N35, T12, T27.	None	201	242	0.5 L	2.5 L	1	5	33, 40
	Fluorotoluenes	3	UN2388	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	40
				III	FLAMMABLE LIQUID.	B1, T8	150	202	242	60 L	220 L	1,3	1,3	
	Forbidden materials. See 173.21	Forbidden												
	Formaldehyde, solutions (*RQ-1000/454*)(*flashpoint greater than 60.5 degrees C*).	9	UN2209	III	None	T1	155	204	240	100 L	220 L	1,2	1,2	34
	Formaldehyde, solutions, *flammable* (*RQ-1000/454*).	3	UN1198	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1,3	40
				III	FLAMMABLE LIQUID.	B1, T8	150	203	242	60 L	220 L	1,3	1,3	40
	Formalin, see Formaldehyde, solutions													
	Formic acid (*RQ-5000/2270*)	8	UN1779	II	CORROSIVE	B2, B12, B28, T8.	154	202	242	1 L	30 L	1,2	1,2	40
	Fracturing devices, explosive, *for oil wells*	1.1D	UN0099											
	Fuel, aviation, turbine engine	3	UN1863	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
D	Fuel oil (*No. 1, 2, 4, 5 or 6*)	3	NA1202	III	None		150	203	241	60 L	220 L	1,3	1,3	
	Fuel, pyrophoric, n.o.s.	4.2	UN1375	I	SPONTANEOUSLY COMBUSTIBLE.	B11	None	181	244	Forbidden	Forbidden	1	5	18
	Fulminate of mercury (dry)	Forbidden												
	Fulminate of mercury, wet, see Mercury fulminate, *etc.*.													
	Fulminating gold	Forbidden												
	Fulminating mercury	Forbidden												
	Fulminating platinum	Forbidden												
	Fulminating silver	Forbidden												
	Fulminic acid	Forbidden												
DE	Fumaric acid (*RQ-5000/2270*)	ORM-E	NA9126	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Fumaryl chloride	8	UN1780	II	CORROSIVE	B2, T8, T26.	154	202	242	1 L	30 L	1	1	80, 40
	Furan	3	UN2389	I	FLAMMABLE LIQUID, POISON.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1	1,3	12, 40, 95
	Furfural (*RQ-1000/454*)	3	UN1199	II	FLAMMABLE LIQUID.	T1	150	202	241	5 L	60 L	1,3	1,3	
	Furfuryl alcohol	6.1	UN2874	III	KEEP AWAY FROM FOOD.	T2	153	203	240	60 L	220 L	1,2	1,2	34, 74
	Furfurylamine	3	UN2526	II	FLAMMABLE LIQUID.	T1	150	202	241	5 L	60 L	1,3	1,3	
	Fuse, detonating, *metal clad, see* Cord, detonating, *metal clad.*													
	Fuse, detonating, mild effect, *metal clad, see* Cord, detonating, mild effect, *metal clad.*													
D	Fusee (*railway or highway*)	4.1	NA1325	II	FLAMMABLE SOLID.		None	184	None	15 kg	50 kg	1,3	1	
	Fuse, igniter *tubular metal clad*	1.4G	UN0103											
	Fuse, instantaneous, non-detonating	1.3G	UN0101											
	Fusel oil	3	UN1201	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Fuse, safety	1.4S	UN0105											
	Fuses, tracer, see Tracers for ammunition													
	Fuzes, combination, percussion and time, see Fuzes, detonating (*UN 0257, 0367*); Fuzes, igniting (UN 0317, 0368).													
	Fuzes, detonating	1.1B	UN0106											

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Fuzes, detonating	1.2B	UN0107											
	Fuzes, detonating	1.4B	UN0257											
	Fuzes, detonating	1.4S	UN0367											
	Fuzes, detonating, *with protective features*	1.1D	UN0408											
	Fuzes, detonating, *with protective features*	1.2D	UN0409											
	Fuzes, detonating, *with protective features*	1.4D	UN0410											
	Fuzes, igniting	1.3G	UN0316											
	Fuzes, igniting	1.4G	UN0317											
	Fuzes, igniting	1.4S	UN0368											
	Galactsan trinitrate	Forbidden												
	Gallium	8	UN2803	I	CORROSIVE		None	162	240	20 kg	20 kg	1,3	1	26, 48
	Gas drips, *hydrocarbon*	3	UN1864	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T1	150	202	242	60 L	220 L	1,3	1,3	
	Gas generator assemblies (aircraft), *containing chlorodifluoromethane (R22) and a propellant cartridge.*	2.2			NONFLAMMABLE GAS.		None	335	None	75 kg	150 kg	1,3	1,3	
D	Gas identification set	2.3	NA9035	II	POISON GAS	10	None	194	None	Forbidden	Forbidden	1	5	
D	Gas identification set	6.1	NA9035	I	POISON		None	194	None	Forbidden	Forbidden	1,2	5	
D	Gasohol (*gasoline mixed with ethyl alcohol, max. 20% alcohol*).	3	NA1203	II	FLAMMABLE LIQUID.		150	202	242	5 L	60 L	1,3	5	12
	Gas oil	3	UN1202	II	FLAMMABLE LIQUID.	T7, T30	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1,3	
	Gasoline	3	UN1203	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	5	12
	Gasoline, casinghead, see Natural gasoline													
	Gelatine, blasting, see Explosive, blasting, type A.													
	Gelatine dynamites, see Explosive, blasting, type A.													
	Germane	2.3	UN2192	IB	POISON GAS, FLAMMABLE GAS.	10	None	192	245	Forbidden	Forbidden	1	5	40, 95
	Glycerol-1,3-dinitrate	Forbidden												
	Glycerol gluconate trinitrate	Forbidden												
	Glycerol lactate trinitrate	Forbidden												
	Glycerol alpha-monochlorohydrin	6.1	UN2689	III	KEEP AWAY FROM FOOD.	T2	153	203	241	60 L	220 L	1,2	1,2	34
	Glyceryl trinitrate, see Nitroglycerin, *etc.*													
	Glycidaldehyde	3	UN2622	II	FLAMMABLE LIQUID, POISON.	T8	150	202	243	1 L	60 L	1,3	1,3	40

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Grenades, *hand or rifle, with bursting charge.*	1.1D	UN0284											
	Grenades, *hand or rifle, with bursting charge.*	1.2D	UN0285											
	Grenades, *hand or rifle, with bursting charge.*	1.1F	UN0292											
	Grenades, *hand or rifle, with bursting charge.*	1.2F	UN0293											
	Grenades, illuminating, see Ammunition, illuminating, *etc.*.													
	Grenades, practice, *hand or rifle*	1.4S	UN0110											
	Grenades, practice, *hand or rifle*	1.3G	UN0318											
	Grenades, practice, *hand or rifle*	1.2G	UN0372											
	Grenades, smoke, see Ammunition, smoke, *etc.*.													
	Guanidine nitrate	5.1	UN1467	III	OXIDIZER	A1	152	213	240	25 kg	100 kg	1,2	1,2	73
	Guanyl nitrosaminoguanylidene hydrazine (dry).	Forbidden												
	Guanyl nitrosaminoguanylidene hydrazine, wetted *with not less than 30 per cent water, by weight.*	1.1A	UN0113											
	Guanyl nitrosaminoguanyltetrazene (dry)	Forbidden												
	Guanyl nitrosaminoguanyltetrazene (Tetrazene), wetted *with not less than 30 per cent water by weight, or mixture of alcohol and water.*	1.1A	UN0114											
	Gunpowder, compressed *or* Gunpowder in pellets, *see* Black powder (*UN 0028*).													
	Gunpowder, *granular or as a meal, see* Black powder (*UN 0027*).													
DE	Guthion. *See* Azinphos methyl													
	Gutta percha solution	3	UN1205	II	FLAMMABLE LIQUID.	T7, T30	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1,3	
	Hafnium powder, dry (*a*) *mechanically produced, particle size between 3 and 53 microns; (b) chemically produced, particle size between 10 and 840 microns.*	4.2	UN2545	II	SPONTANEOUSLY COMBUSTIBLE.	A19, A20, N34.	None	212	241	15 kg	50 kg	1	5	
	Hafnium powder, wetted *with not less than 25 per cent water (a visible excess of water must be present)* (*a*) *mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns.*	4.1	UN1326	II	FLAMMABLE SOLID.	A19, A20, N11, N34.	None	212	241	15 kg	50 kg	1,3	5	
	Halogenated irritating liquids, n.o.s.	6.1	UN1610	I	POISON	T42	None	201	243	Forbidden	30 L	1	5	23, 40, 95
				II	POISON	T14	None	202	243	5 L	60 L	1	5	23, 40, 95

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
				III	POISON	T14	153	202	241	60 L	220 L	1	5	23, 34, 40
	Hand signal device, see Signal devices, hand.													
DE	Hazardous substance, liquid *or* solid, n.o.s.	ORM-E	NA9188	III	None		156	203	241	No limit	No limit	1,2	1,2	
D	Hazardous waste, liquid *or* solid, n.o.s.	ORM-E	NA9189	III	None		156	203	241	No limit	No limit	1,2	1,2	
	Helium, compressed	2.2	UN1046		NONFLAMMABLE GAS.	B13	306	302	244	75 kg	150 kg	1,3	1,3	85
	Helium-oxygen mixture, see Rare gases and oxygen mixtures.													
	Helium, refrigerated liquid (*cryogenic liquid*)	2.2	UN1963		NONFLAMMABLE GAS.		320	316	318	50 kg	500 kg	1,3	1	85
DE	Heptachlor (*RQ-1/0.454*)	ORM-E	NA2761	III	None		156	213	240	No limit	No limit	1,2	1,2	
	n-Heptaldehyde	3	UN3056	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,2	1	
	Heptanes	3	UN1206	II	FLAMMABLE LIQUID.	T2	150	202	242	5 L	60 L	1,3	1	
	n-Heptene	3	UN2278	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Hexachloroacetone	6.1	UN2661	III	KEEP AWAY FROM FOOD.	T8	153	203	241	60 L	220 L	1,2	1,2	12, 34, 40
	Hexachlorobenzene	6.1	UN2729	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34
	Hexachlorobutadiene	6.1	UN2279	III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	1,2	34
E	Hexachlorocyclopentadiene (*RQ-1/0.454*)	6.1	UN2646	I	POISON	T18, T26	None	201	243	1 L	30 L	1	5	40, 95
	Hexachlorophene	6.1	UN2875	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Hexadecyltrichlorosilane	8	UN1781	II	CORROSIVE	B2, B6, N26, N34, T8.	None	202	242	Forbidden	30 L	1	1	40
	Hexadiene	3	UN2458	II	FLAMMABLE LIQUID.	T7	None	202	242	Forbidden	60 L	1,3	5	12
	Hexaethyl tetraphosphate and compressed gas mixtures.	2.3	UN1612	IB	POISON GAS	B14, B31, 10.	None	334	244	Forbidden	Forbidden	1	5	40, 95
	Hexaethyl tetraphosphate, *liquid*	6.1	UN1611	I	POISON	A4	None	201	243	Forbidden	30 L	1,2	5	40, 95
				II	POISON	N76	None	202	243	Forbidden	60 L	1,2	5	40, 95
				III	KEEP AWAY FROM FOOD.	N77	None	203	241	Forbidden	220 L	1,2	5	34, 40
	Hexaethyl tetraphosphate mixture, see Organophosphorous pesticide *etc.*													
	Hexaethyl tetraphosphate, *solid*	6.1	UN1611	I	POISON		None	211	242	Forbidden	15 kg	1,2	5	95
				II	POISON	N76	None	212	242	25 kg	100 kg	1,2	5	95
				III	KEEP AWAY FROM FOOD.	N77	153	213	240	100 kg	200 kg	1,2	5	34
	Hexafluoroacetone	2.3	UN2420	IB	POISON GAS	B14, B31, 10.	None	304	244	Forbidden	Forbidden	1	5	40, 95
	Hexafluoroacetone hydrate	6.1	UN2552	II	POISON		None	202	243	5 L	60 L	1,2	1	40, 95

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Hexafluoroethane	2.2	UN2193		NONFLAMMABLE GAS.	B13	306	304	244	75 kg	150 kg	1,3	1,3	85
	Hexafluorophosphoric acid	8	UN1782	II	CORROSIVE	B2, N3, N11, N26, N34, T9, T27.	None	202	242	Forbidden	30 L	1,2	1,2	
	Hexafluoropropylene	2.2	UN1858		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
D	Hexafluoropropylene oxide	2.2	NA1956		NONFLAMMABLE GAS.	B13	306	304	244, 314	75 kg	150 kg	1,3	1,3	85
	Hexaldehyde	3	UN1207	III	FLAMMABLE LIQUID.	T1	150	203	242	60 L	220 L	1,3	1,3	
	Hexamethylenediamine, solid	8	UN2280	III	CORROSIVE		154	213	242	25 kg	100 kg	1,3	1,3	12
	Hexamethylenediamine solution	8	UN1783	II	CORROSIVE, POISON.	T8	None	202	243	1 L	30 L	1,2	1,2	
	Hexamethylenediisocyanate	6.1	UN2281	II	POISON	T14	None	202	243	5 L	60 L	1,2	1	13, 40, 95
	Hexamethyleneimine	3	UN2493	II	FLAMMABLE LIQUID, CORROSIVE.	T8	None	202	243	1 L	5 L	1,3	1	40
	Hexamethylene triperoxide diamine (dry)	Forbidden												
	Hexamethylol benzene hexanitrate	Forbidden												
	3,3,6,6,9,9-Hexamethyl-1,2,4,5-tetraoxocyclononane, *not more than 52 per cent in solution.*	5.2	UN2167	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	3,3,6,6,9,9-Hexamethyl-1,2,4,5-tetraoxocyclononane, *not more than 52 per cent with inert solid.*	5.2	UN2166	II	ORGANIC PEROXIDE.		152	225	None	5 kg	10 kg	1	5	12, 40
	3,3,6,6,9,9-Hexamethyl-1,2,4,5-tetraoxocyclononane, *technically pure.*	5.2	UN2165	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Hexamine	4.1	UN1328	III	FLAMMABLE SOLID.	A1	151	213	240	25 kg	100 kg	1,3	1,3	
	Hexanes	3	UN1208	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	5	12
	Hexanitroazoxy benzene	Forbidden												
	2,2',4,4',6,6'-Hexanitro-3,3'-dihydroxyazobenzene (dry).	Forbidden												
	2,2',3',4,4',6-Hexanitrodiphenylamine	Forbidden												
	Hexanitrodiphenylamine (Dipicrylamine; Hexyl).	1.1D	UN0079											
	2,3',4,4',6,6'-Hexanitrodiphenylether	Forbidden												
	N,N'-(hexanitrodiphenyl) ethylene dinitramine (dry).	Forbidden												

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Hexanitrodiphenyl urea	Forbidden												
	Hexanitroethane	Forbidden												
	Hexanitrooxanilide	Forbidden												
	Hexanitrostilbene	1.1D	UN0392											
	Hexanoic acid, see Corrosive liquid, n.o.s.													
	Hexanols	3	UN2282	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Hexatonal, cast	1.1D	UN0393											
	1-Hexene	3	UN2370	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	5	12
	Hexogen, *see* Cyclotrimethylenetrinitramine, *etc.*.													
	Hexolite, *dry or wetted a less than 15 per cent water, by weight.*	1.1D	UN0118											
	Hexyl, *see* Hexanitrodiphenylamine													
	Hexyltrichlorosilane	8	UN1784	II	CORROSIVE	B2, B6, N16, N26, N34, T8, T26.	None	202	242	Forbidden	30 L	1	1	40
	High explosives, see individual explosives' entries.													
	HMX, *see* Cyclotetramethylene-tetranitramine, *etc.*.													
	Hydrazine, anhydrous *or* Hydrazine aqueous solutions *with more than 64 per cent hydrazine, by weight.*	3	UN2029	I	FLAMMABLE LIQUID, POISON, CORROSIVE.	B16, B17, B24, N1, N11, N26, N35, T25.	None	201	243	Forbidden	2.5 L	1	5	40
	Hydrazine azide	Forbidden												
	Hydrazine chlorate	Forbidden												
	Hydrazine dicarbonic acid diazide	Forbidden												
	Hydrazine hydrate *or* Hydrazine aqueous solutions, *with not more than 64 per cent hydrazine, by weight.*	8	UN2030	II	CORROSIVE, POISON.	B16, B17, B24, T15.	None	202	243	Forbidden	30 L	1	5	40, 42, 82
	Hydrazine perchlorate	Forbidden												
	Hydrazine selenate	Forbidden												
	Hydrides, metal, n.o.s.	4.3	UN1409	I	DANGEROUS WHEN WET.	A19, N34	None	211	242	Forbidden	15 kg	1	5	22

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Hydriodic acid, anhydrous, see Hydrogen iodide, anhydrous.													
	Hydriodic acid, solution	8	UN1787	II	CORROSIVE	B2, N1, N11, N16, N34, N41, T9, T27.	154	202	242	1 L	30 L	1	1	8
	Hydrobromic acid, anhydrous, see Hydrogen bromide, anhydrous.													
	Hydrobromic acid solution, *more than 49 per cent strength.*	8	UN1788	I		B4, B15, N1, N11, N16, N34, N41.	None	201	242	Forbidden	Forbidden	1	1	83, 33
	Hydrobromic acid solution, *not more than 49 per cent strength.*	8	UN1788	II	CORROSIVE	B2, B15, N1, N11, N16, N34, N41.	154	202	242	1 L	30 L	1	1	
	Hydrocarbon gases, compressed, n.o.s. *or* Hydrocarbon gases mixtures, compressed, n.o.s.	2.1	UN1964		FLAMMABLE GAS.	B13	306	302	244	Forbidden	150 kg	1,3	1	40, 85
	Hydrocarbon gases, liquefied, n.o.s. *or* Hydrocarbon gases mixtures, liquefied, n.o.s.	2.1	UN1965		FLAMMABLE GAS.	B13	306	304	244	Forbidden	150 kg	1,3	1	40, 85
	Hydrochloric acid, anhydrous, see Hydrogen chloride, anhydrous.													
E	Hydrochloric acid, solution (*RQ-5000/2270*).	8	UN1789	II	CORROSIVE	B2, B8, B15, N1, N11, N34, N41, T9, T27.	154	202	242	1 L	30 L	1	1	83, 33
	Hydrocyanic acid, anhydrous, see Hydrogen cyanide.													
E	Hydrocyanic acid, aqueous solutions (*RQ-10/4.54*)*not more than 20% HCN.*	6.1	UN1613	I	POISON	B12, B14, B32, 10.	None	195	244	Forbidden	Forbidden	1	5	40, 95
E	Hydrocyanic acid, aqueous solutions (*RQ-10/4.54*)*less than 5% HCN.*	6.1	UN1613	II	POISON	B12, T18, T28.	None	195	243	Forbidden	5 L	1	5	40
	Hydrocyanic acid, liquefied, see Hydrogen cyanide, *etc.*.													

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
E	Hydrofluoric acid and Sulfuric acid mixtures (*RQ-1000/454*).	8	UN1786	I	CORROSIVE, POISON.	B15, B23, N5, N11, N26, N34, T18, T27.	None	201	243	Forbidden	2.5 L	1	5	33, 40
	Hydrofluoric acid, anhydrous, see Hydrogen fluoride, anhydrous.													
E	Hydrofluoric acid, solution, *more than 60 per cent* (*RQ-5000/2270*).	8	UN1790	I	CORROSIVE, POISON.	B4, B12, B15, B23, N5, N11, N26, N34, T18, T27.	None	201	243	0.5 L	2.5 L	1	5	12
E	Hydrofluoric acid, solution, *not more than 60 per cent* (*RQ-5000/2270*).	8	UN1790	II	CORROSIVE, POISON.	B12, B15, N5, N11, N26, N34, T18, T27.	None	202	243	1 L	30 L	1	5	12
	Hydrofluoroboric acid, see Fluoboric acid													
	Hydrofluorosilicic acid, see Fluorosilicic acid.													
	Hydrogen and Methane mixtures, compressed.	2.1	UN2034		FLAMMABLE GAS.	B13	306	302	244	Forbidden	150 kg	1,3	5	40, 85
	Hydrogen bromide, anhydrous	2.3	UN1048	II	POISON GAS, CORROSIVE.	B13, B14, B33, 10.	None	304	244	Forbidden	Forbidden	1	5	40, 95
E	Hydrogen chloride, anhydrous (*RQ-5000/2270*).	2.3	UN1050	II	POISON GAS, CORROSIVE.	B13, B34, 10.	None	304	244	Forbidden	Forbidden	1	5	34, 40, 95
E	Hydrogen chloride, refrigerated liquid (*RQ-5000/2270*).	2.3	UN2186	II	POISON GAS, CORROSIVE.	B6, 10	None	None	314, 315	Forbidden	Forbidden	1,3	4	40
	Hydrogen, compressed	2.1	UN1049		FLAMMABLE GAS.	B13	306	302	244	Forbidden	150 kg	1,3	5	40, 57, 85
E	Hydrogen cyanide, anhydrous, stabilized (*RQ-10/4.54*).	6.1	UN1051	I	POISON, FLAMMABLE LIQUID.	B12, B14, B30, 10.	None	195	244	Forbidden	Forbidden	1	5	21, 25, 40, 95
E	Hydrogen cyanide, anhydrous, stabilized, *absorbed in a porous inert material* (*RQ-10/4.54*).	6.1	UN1614	I	POISON	B12	None	195	243	Forbidden	5 L	1	5	25, 40, 95
	Hydrogen cyanide, unstabilized	Forbidden												
E	Hydrogen fluoride, anhydrous (*RQ-5000/2270*).	8	UN1052	I	CORROSIVE, POISON.	B12, T24, T27.	None	163	243	Forbidden	Forbidden	1	5	40

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(6) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Hydrogen iodide, anhydrous	2.2	UN2197		NONFLAMMABLE GAS, CORROSIVE.	B13	306	304	244	Forbidden	Forbidden	1	5	40, 85
	Hydrogen iodide solution, see Hydriodic acid, solution.													
	Hydrogen peroxide, aqueous solutions *with more than 40 per cent but not more than 60 per cent hydrogen peroxide (stabilized as necessary).*	5.1	UN2014	II	OXIDIZER, CORROSIVE.	B12, B17, B28, N1, N11, N41, T14.	None	202	243	Forbidden	Forbidden	1	5	25, 46, 75
	Hydrogen peroxide, aqueous solutions *with not less than 20 per cent but not more than 40 per cent hydrogen peroxide (stabilized as necessary).*	5.1	UN2014	II	OXIDIZER, CORROSIVE.	A2, B11, B12, B17, B28, N1, N11, N41, T14.	None	202	243	1 L	5 L	1	5	25, 46, 75
	Hydrogen peroxide, aqueous solutions *with not less than 8 per cent but less than 20 per cent hydrogen peroxide (stabilized as necessary).*	5.1	UN2984	III	OXIDIZER	A1, N41, 17.	152	203	241	2.5 L	30 L	1,2	1	25, 46, 75
	Hydrogen peroxide, stabilized *or* Hydrogen peroxide aqueous solutions, stabilized *with more than 60 per cent hydrogen peroxide.*	5.1	UN2015	I	OXIDIZER, CORROSIVE.	B12, B17, B28, N1, N11, N41, T15.	None	201	243	Forbidden	Forbidden	1	5	25, 46, 75
	Hydrogen, refrigerated liquid (*cryogenic liquid*).	2.1	UN1966		FLAMMABLE GAS.		None	316	318, 319	Forbidden	Forbidden	5	5	40, 85
	Hydrogen selenide, anhydrous	2.3	UN2202	IA	POISON GAS, FLAMMABLE GAS.	10	None	192	245	Forbidden	Forbidden	1	5	40, 95
	Hydrogen sulfate, see Sulfuric acid													
E	Hydrogen sulfide, liquefied (*RQ-100/45.4*)	2.3	UN1053	IB	POISON GAS, FLAMMABLE GAS.	B13, 10	None	304	245	Forbidden	Forbidden	1	5	34, 40, 95
	Hydroquinone	6.1	UN2662	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Hydrosilicofluoric acid, see Fluorosilicic acid.													
	3-(2-Hydroxyethoxy)-4-pyrrolidin-1-ylbenzenedazonium zinc chloride.	4.1	UN3035	II	FLAMMABLE SOLID.		None	214	240	Forbidden	Forbidden	1	5	2
	Hydroxyl amine iodide	Forbidden												
AW	Hydroxylamine sulfate	8	UN2865	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
DE	Hypochlorite solution containing not more than 5% available chlorine *by weight* (*RQ-100/45.4*).	ORM-E	NA9301	III	None		156	203	241	No limit	No limit	1,2	1,2	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
E	Hypochlorite solutions *with more than 5 per cent but less than 16 per cent available chlorine (RQ-100/45.4).*	8	UN1791	III	CORROSIVE	N34, T7	154	203	241	5 L	60 L	1,2	1	
E	Hypochlorite solutions *with not less than 16 per cent available chlorine (RQ-100/45.4).*	8	UN1791	II	CORROSIVE	B2, B15, B37, N26, N34, T7.	154	202	242	1 L	30 L	1,2	1	
	Hyponitrous acid	Forbidden												
	Igniter for aircraft thrust device *for assisted take-off.*	4.1	UN2792	II	FLAMMABLE SOLID.		None	180	None	Forbidden	50 kg	1,3	5	
	Igniter fuse, metal clad, see Fuse, igniter, tubular, metal clad.													
	Igniters	1.1G	UN0121											
	Igniters	1.2G	UN0314											
	Igniters	1.3G	UN0315											
	Igniters *Iminobispropylamine, see* 3,3-Iminodipropylamine.	1.4G	UN0325											
	3,3'-Iminodipropylamine	8	UN2269	III	CORROSIVE	T8	154	203	241	5 L	60 L	1,2	1,2	
I	Infectious substances, affecting animals *only*, n.o.s. (*See also* Etiologic agent,n.o.s.).	6.2	UN2900		INFECTIOUS SUBSTANCE.		196	196	None	50ml	4 L	5	5	
I	Infectious substances, affecting humans (*See also* Etiologic agent,n.o.s.).	6.2	UN2814		INFECTIOUS SUBSTANCE.		196	196	None	50ml	4 L	5	5	
	Inflammable, see Flammable													
	Initiating explosives (dry)	Forbidden												
	Ink, *printer's, flammable*	3	UN1210	II	FLAMMABLE LIQUID.	T7, T30,	150	173	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	173	242	60 L	220 L	1,3	1,3	
	Inositol hexanitrate (dry)	Forbidden												
	Insecticide gases, n.o.s.	2.2	UN1968		NONFLAMMABLE GAS.	B13	306	304	244	75 kg	150 kg	1,3	1,3	95
	Insecticide gases, toxic, n.o.s.	2.3	UN1967	IB	POISON GAS	10	None	193, 334	245	Forbidden	Forbidden	1	5	25, 40, 95
	Inulin trinitrate (dry)	Forbidden												
	Iodine azide (dry)	Forbidden												
	Iodine monochloride	8	UN1792	II	CORROSIVE	B6, N16, N34, N41, T8, T26.	None	202	242	Forbidden	50 kg	1	5	40
	Iodine pentafluoride	5.1	UN2495	I	OXIDIZER, POISON.		None	205	243	Forbidden	2.5 L	1	5	13, 40
	2-Iodobutane	3	UN2390	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Iodomethylpropanes	3	UN2391	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Iodopropanes	3	UN2392	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	40
				III	FLAMMABLE LIQUID.		150	203	241	60 L	220 L	1,2	1,2	
	Iodoxy compounds (dry)	Forbidden												
	Iridium nitratopentamine iridium nitrate	Forbidden												
	Iron chloride, see Ferric chloride													
	Iron oxide, spent, *or* Iron sponge, spent (*obtained from coal gas purification*).	4.2	UN1376	III	SPONTANEOUSLY COMBUSTIBLE.	B18	None	213	240	Forbidden	Forbidden	1,3	5	
	Iron pentacarbonyl	6.1	UN1994	I	POISON, FLAMMABLE LIQUID.	B14, B30, 10.	None	192	244	Forbidden	Forbidden	1	5	21, 25, 40, 95
	Iron sesquichloride, see Ferric chloride													
	Irritating agents, see Tear gas substances, *etc.*.													
	Isobutane *or* Isobutane mixtures *see also* Petroleum gases, liquified.	2.1	UN1969		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	Isobutanol *or* Isobutyl alcohol	3	UN1212	III	FLAMMABLE LIQUID.	T1	150	203	241	5 L	60 L	1,3	1	
E	Isobutyl acetate (*RQ-5000/2270*)	3	UN1213	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Isobutyl acrylate	3	UN2527	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1,3	
	Isobutyl alcohol, *see* Isobutanol													
	Isobutyl aldehyde, *see* Isobutyraldehyde													
E	Isobutylamine (*RQ-1000/454*)	3	UN1214	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	40
	Isobutylene *see also* Petroleum gases, liquified.	2.1	UN1055		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	Isobutyl formate	3	UN2393	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Isobutyl isobutyrate	3	UN2528	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Isobutyl isocyanate	3	UN2486	II	FLAMMABLE LIQUID, POISON.	T9	None	202	243	1 L	60 L	1	5	12, 40, 48
	Isobutyl methacrylate	3	UN2283	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Isobutyl propionate	3	UN2394	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Isobutyraldehyde *or* Isobutyl aldehyde	3	UN2045	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	5	12, 40
E	Isobutyric acid (*RQ-5000/2270*)	3	UN2529	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Isobutyric anhydride	3	UN2530	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Isobutyronitrile	3	UN2284	II	FLAMMABLE LIQUID, POISON.	T17	None	202	243	1 L	60 L	1,3	5	12, 40
	Isobutyryl chloride	3	UN2395	II	FLAMMABLE LIQUID, CORROSIVE.	T9, T26	None	202	243	1 L	5 L	1	1	13, 25, 40
	Isocyanates, n.o.s. *or* Isocyanate solutions, n.o.s. *boiling point not less than 300deg C.*	6.1	UN2207	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34, 48
	Isocyanates, n.o.s. *or* Isocyanate solutions, n.o.s., *flash point more than 60.5deg C and boiling point less than 300deg C.*	6.1	UN2206	II	POISON	T15	None	202	243	5 L	60 L	1,3	1	25, 40, 95
	Isocyanates, n.o.s. *or* Isocyanate solutions, n.o.s., *flash point not less than 23deg C but less than 60.5deg C and boiling point less than 300deg C.*	6.1	UN2206	II	POISON, FLAMMABLE LIQUID.	T15	None	202	243	5 L	60 L	1,3	1	22, 25, 40, 95
	Isocyanates, n.o.s. *or* Isocyanate solutions, n.o.s., *flash point less than 23deg C.*	3	UN2478	I	FLAMMABLE LIQUID, POISON.	B40, N1, N26.	None	201	243	Forbidden	Forbidden	1	5	12, 40, 48
				II	FLAMMABLE LIQUID, POISON.	N1, N26	None	202	243	1 L	60 L	1	5	12, 40, 48
	Isocyanatobenzotrifluorides	6.1	UN2285	II	POISON	T14	None	202	243	5 L	60 L	1,2	1	25, 40, 95
	Isoheptene	3	UN2287	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	5	12
	Isohexene	3	UN2288	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	5	12
	Isononanoyl peroxide, see Di-(3,3,5-trimethylhexanoyl) peroxide.													
	Isooctane, see Octanes													
	Isooctene	3	UN1216	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Isopentane, *see* n-Pentane													
	Isopentanoic acid, see Corrosive liquids, n.o.s.													
	Isopentenes	3	UN2371	I	FLAMMABLE LIQUID.	N15, T20	150	201	243	1 L	30 L	1,3	5	12
AW	Isophoronediamine	8	UN2289	III	CORROSIVE	T8	154	203	241	5 L	60 L	1,2	1,2	8
	Isophoronediisocyanate	6.1	UN2290	III	KEEP AWAY FROM FOOD.	T8	153	203	241	60 L	220 L	1,2	1	34, 40
E	Isoprene, inhibited (*RQ-1000/454*)	3	UN1218	I	FLAMMABLE LIQUID.	T20	150	201	243	Forbidden	30 L	1,3	5	12
	Isopropanol *or* Isopropyl alcohol	3	UN1219	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
DE	Isopropanolamine dodecylbenzenesulfonate (*RQ-1000/454*).	ORM-E	NA9127	III	None		156	213	240	No limit	No limit	1,2	1,2	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Isopropenyl acetate	3	UN2403	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Isopropenyl benzene	3	UN2303	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1,3	
	Isopropyl acetate	3	UN1220	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Isopropyl acid phosphate	8	UN1793	III	CORROSIVE	T7	154	213	240	25 kg	100 kg	1,2	1,2	
	Isopropyl alcohol, *see* Isopropanol													
	Isopropylamine	3	UN1221	I	FLAMMABLE LIQUID.	T20	None	201	243	Forbidden	30 L	1,3	5	12, 40
	Isopropylbenzene	3	UN1918	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Isopropyl butyrate	3	UN2405	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Isopropyl chloroacetate	3	UN2947	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Isopropyl chloroformate	3	UN2407	I	FLAMMABLE LIQUID, POISON, CORROSIVE.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,3	1	40
	Isopropyl-2-chloropropionate	3	UN2934	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Isopropylcumyl hydroperoxide *or* Diisopropylbenzene hydroperoxide, *not more than 72 per cent in solution.*	5.2	UN2171	I	ORGANIC PEROXIDE.	B21, T25	None	225	243	1 L	5 L	1	5	12, 40
	Isopropylcumyl hydroperoxide, more than 72 per cent in solution.	Forbidden												
	Isopropyl isobutyrate	3	UN2406	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Isopropyl isocyanate	3	UN2483	I	FLAMMABLE LIQUID, POISON.	N15, N26, T18, T26.	None	201	243	Forbidden	30 L	1	5	12, 40
	Isopropyl mercaptan, see Propanethiols													
	Isopropyl nitrate	3	UN1222	II	FLAMMABLE LIQUID.	T25	150	202	None	5 L	60 L	1,3	1	
	Isopropyl peroxydicarbonate, *see* Diisopropyl peroxydicarbonate, *etc.*.													
	Isopropyl phosphoric acid, see Isopropyl acid phosphate.													
	Isopropyl propionate	3	UN2409	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Isosorbide dinitrate mixture *with not less than 60 per cent lactose, mannose, starch or calcium hydrogen phosphate.*	4.1	UN2907	II	FLAMMABLE SOLID.		None	212	None	15 kg	50 kg	1,3	5	
	Isothiocyanic acid	Forbidden												
	Jet fuel, see Fuel aviation, turbine engine													
	Jet perforating guns, charged *oil well, without detonator.*	1.1D	UN0124											

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***) Exceptions	Non-bulk packaging	Bulk packaging	(9) Quantity limitations Passenger aircraft or railcar	Cargo aircraft only	(10) Vessel stowage requirements Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Jet perforators, see Charges, shaped, commercial.													
	Jet tappers, without detonator, see Charges, shaped, etc..													
	Jet thrust igniters, for rocket motors or Jato, see Igniters.													
	Jet thrust unit (Jato), see Rocket motors													
DE	Kelthane (*RQ-5000/2270*)	ORM-E	NA2761	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Kepone (*RQ-1/0.454*)	ORM-E	NA2761	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Kerosene	3	UN1223	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Ketones, liquid, n.o.s.	3	UN1224	II	FLAMMABLE LIQUID.	T8, T30	150	202	242	5 L	60 L	1,3	1	12
				III	FLAMMABLE LIQUID.	B1, T7, T31.	150	203	242	60 L	220 L	1,3	1,3	
	Krypton, compressed	2.2	UN1056		NONFLAMMABLE GAS.	B13	306	302	244	75 kg	150 kg	1,3	1,3	85
	Krypton, refrigerated liquid	2.2	UN1970		NONFLAMMABLE GAS.	B13	320		244	50 kg	500 kg	1,3	1,3	85
D	Lacquer base, *or* Lacquer chips, dry	4.1	NA2557	II	FLAMMABLE SOLID.	A19, N16	151	212	240	1 kg	15 kg	1	1	
	Lacquer base or lacquer chips, nitrocellulose, dry, see Nitrocellulose, *etc.* (*UN 2557*).													
	Lacquer base or lacquer chips, plastic, wet with alcohol or solvent, see Nitrocellulose (*UN 2059, 2060, 2555, 2556*) *or* Paints, enamels, *etc.* (*UN 1263*).													
	Lauroyl peroxide, *see* Dilauroyl peroxide													
E	Lead acetate (*RQ-5000/2270*)	6.1	UN1616	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
E	Lead arsenates (*RQ-5000/2270*)	6.1	UN1617	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Lead arsenites	6.1	UN1618	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Lead azide (dry)	Forbidden												
	Lead azide, wetted *with not less than 20 per cent water, by weight, or mixture of alcohol and water.*	1.1A	UN0129											
DE	Lead chloride (*RQ-5000/2270*)	6.1	NA2291	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
	Lead compounds, soluble, n.o.s.	6.1	UN2291	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Lead cyanide	6.1	UN1620	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	26, 95
	Lead dioxide	5.1	UN1872	III	OXIDIZER	A1	152	213	240	25 kg	100 kg	1,2	1,2	34
	Lead dross, see Lead sulphate, *with more than 3% free acid.*													
DE	Lead fluoborate (*RQ-5000/2270*)	6.1	NA2291	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
DE	Lead fluoride (*RQ-1000/454*)	6.1	NA2811	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
DE	Lead iodide (*RQ-5000/2270*)	ORM-E	NA2811	III	None		156	213	240	No limit	No limit	1,2	1,2	
E	Lead nitrate (*RQ-5000/2270*)	5.1	UN1469	II	OXIDIZER, POISON.		None	212	242	5 kg	25 kg	1,2	1,2	95
	Lead nitroresorcinate (dry)	Forbidden												
	Lead perchlorate	5.1	UN1470	II	OXIDIZER, POISON.	T8	None	212	242	5 kg	25 kg	1,2	1,2	46, 95
	Lead peroxide, see Lead dioxide													
	Lead phosphite, dibasic	4.1	UN2989	II	FLAMMABLE SOLID.		None	212	240	5 kg	25 kg	1,3	1	34
	Lead picrate (dry)	Forbidden												
DE	Lead stearate (*RQ-5000/2270*)	ORM-E	NA2811	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Lead styphnate (dry)	Forbidden												
	Lead styphnate (Lead trinitroresorcinate), wetted *with not less than 20 per cent water, by weight (or mixture of alcohol and water).*	1.1A	UN0130											
DE	Lead sulfate (*RQ-5000/2270*)	6.1	NA2291	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
E	Lead sulfate *with more than 3 per cent free acid* (*RQ-5000/2270*).	8	UN1794	II	CORROSIVE.		154	212	240	15 kg	50 kg	1,2	1,2	
DE	Lead sulfide (*RQ-5000/2270*)	6.1	NA2291	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
DE	Lead thiocyanate (*RQ-5000/2270*)	6.1	NA2291	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
	Lead trinitroresorcinate, *see* Lead styphnate, *etc.*.													
	Life-saving appliances, not self inflating *containing hazardous materials as equipment.*	9	UN3072	III	None			219	None	No limit	No limit	1,2	1,2	
	Life-saving appliances, self inflating	9	UN2990	III	None			219	None	No limit	No limit	1,2	1,2	
I	Lighter fluids	3	UN1226	II	FLAMMABLE LIQUID.		150	202	None	5 L	60 L	1,3	5	12
	Lighter replacement cartridges containing liquefied petroleum gases (and similar devices, each not exceeding 65 grams), see Lighters for cigars, cigarettes, *etc. with flammable gas.*													
	Lighters for cigars, cigarettes, *etc. with flammable gas; or* Flammable gas in lighters.	2.1	UN1057		FLAMMABLE GAS.	21	None	308	None	1 kg	15 kg	1	1	40
	Lighters for cigars, cigarettes, *etc., with lighter fluids.*	3	UN1226	II	FLAMMABLE LIQUID.	N72	150	202	None	Forbidden	Forbidden	1,3	1	12
	Lighters, fuse	1.4S	UN0131											
	Lime, unslaked, see Calcium oxide													

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
DE	Lindane (*RQ-1/0.454*)	6.1	NA2761	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
	Liquefied gases, *non-flammable charged with nitrogen, carbon dioxide or air.*	2.2	UN1058		NONFLAMMABLE GAS.	B13	306	304	244	75 kg	150 kg	1,3	1,3	85
	Liquefied hydrocarbon gas, see Hydrocarbon gases, liquefied, n.o.s., *etc.*													
	Liquefied natural gas, see Methane, *etc.* (*UN 1972*).													
	Liquefied petroleum gas *see* Petroleum gases, liquefied.													
	Lithium	4.3	UN1415	II	DANGEROUS WHEN WET.	A19, N16, N26, N34, N45, 22.	None	212	None	Forbidden	50 kg	1	5	
	Lithium acetylide ethylenediamine complex, see Substances which in contact with water emit flammable gases.													
	Lithium alkyls	4.2	UN2445	I	SPONTANEOUSLY COMBUSTIBLE.	B11, T28, T40.	None	181	244	Forbidden	Forbidden	1	5	
	Lithium aluminum hydride	4.3	UN1410	I	DANGEROUS WHEN WET.	A19	None	211	242	Forbidden	15 kg	1	5	
	Lithium aluminum hydride, ethereal	4.3	UN1411	I	DANGEROUS WHEN WET, FLAMMABLE LIQUID.	A2, N1, N16, N34, N40.	None	201	244	Forbidden	1 L	1	5	40
	Lithium batteries	4.3		II	DANGEROUS WHEN WET.		None	185	None	Forbidden	35 kg	1,3	5	
	Lithium borohydride	4.3	UN1413	I	DANGEROUS WHEN WET.	A19	None	211	242	Forbidden	15 kg	1,3	5	
DE	Lithium chromate (*RQ-1000/454*)	ORM-E	NA9134	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Lithium ferrosilicon	4.3	UN2830	II	DANGEROUS WHEN WET.	A19	None	212	241	15 kg	50 kg	1,3	5	
	Lithium hydride	4.3	UN1414	I	DANGEROUS WHEN WET.	A19	None	211	242	Forbidden	15 kg	1	5	
	Lithium hydride, fused solid	4.3	UN2805	II	DANGEROUS WHEN WET.	A19, A20, N2.	None	212	241	15 kg	50 kg	1	5	
	Lithium hydroxide, monohydrate	8	UN2680	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	
	Lithium hydroxide, solution	8	UN2679	II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1,2	1,2	96
	Lithium hypochlorite, dry *or* Lithium hypochlorite mixtures.	5.1	UN1471	II	OXIDIZER	N13, N34	152	212	None	5 kg	25 kg	1,2	1,2	
	Lithium in cartridges, see Lithium													
	Lithium nitrate	5.1	UN2722	III	OXIDIZER	A1	152	213	240	25 kg	100 kg	1,2	1,2	
	Lithium nitride	4.3	UN2806	I	DANGEROUS WHEN WET.	A19	None	211	242	Forbidden	15 kg	1,3	5	
	Lithium peroxide	5.1	UN1472	II	OXIDIZER	N13, N34	152	212	None	5 kg	25 kg	1,2	1,2	13
	Lithium silicon	4.3	UN1417	II	DANGEROUS WHEN WET.	A19, A20	None	212	241	15 kg	50 kg	1,3	1,3	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	LNG, see Methane *etc. (UN 1972)*													
	London Purple	6.1	UN1621	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	LPG, see Petroleum gases, liquefied													
	Lye, see Sodium hydroxide, solutions													
	Magnesium *or* Magnesium alloys *with more than 50 per cent magnesium in pellets, turnings or ribbons.*	4.1	UN1869	III	FLAMMABLE SOLID.	A1	151	213	240	25 kg	100 kg	1,3	1,3	39
	Magnesium alkyls	4.2	UN3053	I	SPONTANEOUSLY COMBUSTIBLE.	B11, T28, T29, T42.	None	181	244	Forbidden	Forbidden	1	5	18
	Magnesium aluminum phosphide	4.3	UN1419	I	DANGEROUS WHEN WET.	A19, N34	None	211	242	Forbidden	15 kg	1,3	5	40, 85
	Magnesium arsenate	6.1	UN1622	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Magnesium bisulfite solution, *see* Bisulfites, inorganic aqueous solutions, n.o.s.													
	Magnesium bromate	5.1	UN1473	III	OXIDIZER	A1	152	213	240	5 kg	25 kg	1,2	1,2	46, 56
	Magnesium chlorate	5.1	UN2723	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
	Magnesium diamide	4.2	UN2004	II	SPONTANEOUSLY COMBUSTIBLE.	A19, A20, N2.	None	212	241	15 kg	50 kg	1	1	
	Magnesium diphenyl	4.2	UN2005	I	SPONTANEOUSLY COMBUSTIBLE.		None	211	244	Forbidden	Forbidden	1	1	
	Magnesium dross, wet or hot	Forbidden												
	Magnesium fluorosilicate	6.1	UN2853	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	26, 34
	Magnesium granules, coated, *particle size not less than 149 microns.*	4.3	UN2950	I	DANGEROUS WHEN WET.	A1, A19	None	211	None	25 kg	100 kg	1,3	1,3	
	Magnesium hydride	4.3	UN2010	I	DANGEROUS WHEN WET.	A19	None	211	242	Forbidden	15 kg	1	5	
	Magnesium nitrate	5.1	UN1474	III	OXIDIZER	A1, T2	152	213	240	25 kg	100 kg	1,2	1,2	
	Magnesium perchlorate	5.1	UN1475	II	OXIDIZER	B10, T8	152	212	240	5 kg	25 kg	1,2	1,2	46
	Magnesium peroxide	5.1	UN1476	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	13
	Magnesium phosphide	4.3	UN2011	I	DANGEROUS WHEN WET, POISON.	A19	None	211	None	Forbidden	15 kg	1,3	5	85
	Magnesium, powder *or* Magnesium alloys, powder.	4.3	UN1418	II	DANGEROUS WHEN WET, SPONTANEOUSLY COMBUSTIBLE.	A19	None	212	241	15 kg	50 kg	1,3	1,3	39
	Magnesium scrap, see Magnesium, *etc. (UN 1869).*													
	Magnesium silicide	4.3	UN2624	II	DANGEROUS WHEN WET.	A19, A20	None	212	241	15 kg	50 kg	1,3	1	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Magnetized material. See 173.21													
DE	Malathion (*RQ-10/4.54*)	6.1	NA2783	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	
DE	Maleic acid (*RQ-5000/2270*)	8	NA2215	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
E	Maleic anhydride (*RQ-5000/2270*)	8	UN2215	III	CORROSIVE	T7, T38	154	213	240	25 kg	100 kg	1,2	1,2	34, 40
	Malononitrile	6.1	UN2647	II	POISON		None	202	243	5 L	60 L	1,3	1,3	12, 95
	Maneb *or* Maneb preparations, *stabilized against self-heating.*	4.3	UN2968	III	DANGEROUS WHEN WET.	A1, A19	None	213	240	25 kg	100 kg	1,3	1	34
	Maneb *or* Maneb preparations *with not less than 60 per cent maneb.*	4.2	UN2210	III	SPONTANEOUSLY COMBUSTIBLE, DANGEROUS WHEN WET.	A1, A19	None	213	240	25 kg	100 kg	1,3	1,3	12, 13, 34
	Manganese nitrate	5.1	UN2724	III	OXIDIZER	A1	152	213	240	25 kg	100 kg	1,2	1,2	
	Manganese resinate	4.1	UN1330	III	FLAMMABLE SOLID.	A1	151	213	240	25 kg	100 kg	1,3	1,3	
	Mannitan tetranitrate	Forbidden												
	Mannitol hexanitrate (dry)	Forbidden												
	Mannitol hexanitrate (Nitromannite), wetted *with not less than 40 per cent water, by weight or mixture of alcohol and water.*	1.1D	UN0133											
	Matches, block, see Matches, 'strike anywhere'.													
	Matches, fusee	4.1	UN2254	III	FLAMMABLE SOLID.		186	186	None	Forbidden	Forbidden	1,3	1,3	
	Matches, safety (*book, card or strike on box*).	4.1	UN1944	III	FLAMMABLE SOLID.		186	186	None	25 kg	100 kg	1,3	1,3	
	Matches, 'strike anywhere'	4.1	UN1331	III	FLAMMABLE SOLID.		186	186	None	Forbidden	Forbidden	1,3	1	
	Matches, wax, 'Vesta'	4.1	UN1945	III	FLAMMABLE SOLID.		186	186	None	25 kg	100 kg	1,3	1	
	Matting acid, see Sulfuric acid													
	Medicines, *corrosive, liquid,* n.o.s.	8	UN1851	II	CORROSIVE	B2	154	202	242	1 L	30 L	1,2	1,2	
				III	CORROSIVE		154	203	241	5 L	60	1,2	1,2	
	Medicines, *corrosive, solid,* n.o.s.	8	UN1851	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	
				III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
	Medicines, *flammable, liquid,* n.o.s.	3	UN1851	I	FLAMMABLE LIQUID.		150	201	243	1 L	30 L	1,3	5	
				II	FLAMMABLE LIQUID.		150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1	150	203	242	60 L	220 L	1,3	1,3	
	Medicines, *flammable, solid,* n.o.s.	4.1	UN1851	II	FLAMMABLE SOLID.		151	212	240	15 kg	50 kg	1,3	1,3	
	Medicines, *oxidizing substance, solid,* n.o.s.	5.1	UN1851	II	OXIDIZER	B10	152	212	240	5 kg	25 kg			
	Medicines, *poisonous, liquid,* n.o.s.	6.1	UN1851	I	POISON		153	201	243	1 L	30 L	1,2	1	95
				II	POISON		153	202	243	5 L	60 L	1,2	1	95

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1	34
	Medicines, *poisonous, solid,* n.o.s.	6.1	UN1851	I	POISON		153	211	242	5 kg	50 kg	1,2	1	95
				II	POISON		153	212	242	25 kg	100 kg	1,2	1	95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1	34
	Memtetrahydrophthalic anhydride, see Corrosive liquids, n.o.s..													
	p-Menthane hydroperoxide, *see* p-Menthyl hydroperoxide, *technically pure.*													
	p-Menthyl hydroperoxide, *technically pure*	5.2	UN2125	I	ORGANIC PEROXIDE.	B21, T9, T35.	None	225	243	1 L	5 L	1	5	12, 40
	Mercaptan, liquid n.o.s. *or* Mercaptan mixtures, liquid, n.o.s.,	6.1	UN3071	I	POISON, FLAMMABLE LIQUID.	B40, T42	None	202	243	1 L	30 L	1,3	1	21
				II	POISON, FLAMMABLE LIQUID.	T14	None	202	243	5 L	60 L	1,3	1	21
				III	POISON, FLAMMABLE LIQUID.	T14	None	202	241	60 L	220 L	1,3	1,3	
	Mercaptans, liquid, n.o.s. *or* Mercaptan mixtures, liquid, n.o.s..	3	UN1228	II	FLAMMABLE LIQUID, POISON.	N16, T14	None	202	243	Forbidden	60 L	1,3	5	12
DE	Mercaptodimethur (*RQ-100/45.4*)	ORM-E	NA2757	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Mercuric arsenate	6.1	UN1623	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Mercuric chloride	6.1	UN1624	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Mercuric compounds, see Mercury compounds, *etc.*.													
E	Mercuric nitrate (*RQ-10/4.54*)	6.1	UN1625	II	POISON	N73	None	212	242	25 kg	100 kg	1,2	1,2	95
	Mercuric potassium cyanide	6.1	UN1626	I	POISON	N74, N75	None	211	242	5 kg	50 kg	1,2	1,2	26, 95
E	Mercuric sulfate (*RQ-10/4.54*)	6.1	UN1645	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Mercuric sulfocyanate, see Mercury thiocyanate.													
	Mercurol, see Mercury nucleate													
	Mercurous azide	Forbidden												
	Mercurous compounds, see Mercury compounds, *etc.*.													
E	Mercurous nitrate (*RQ-10/4.54*)	6.1	UN1627	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Mercurous sulfate	6.1	UN1628	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Mercury acetate	6.1	UN1629	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Mercury acetylide	Forbidden												
	Mercury ammonium chloride	6.1	UN1630	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Mercury based pesticides, liquid, flammable, toxic, n.o.s., *flash point less than 23deg C.*	3	UN2778	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	5	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***) Exceptions	Non-bulk packaging	Bulk packaging	(9) Quantity limitations Passenger aircraft or railcar	Cargo aircraft only	(10) Vessel stowage requirements Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	
	Mercury based pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23deg C.*	6.1	UN3011	I	POISON, FLAMMABLE LIQUID.	T42	None	201	243	1 L	30 L	1	1	40, 95
				II	POISON, FLAMMABLE LIQUID.	T14	None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	202	241	60 L	220 L	1,2	1	34, 40
	Mercury based pesticides, liquid, toxic, n.o.s..	6.1	UN3012	I	POISON	T42	None	201	243	1 L	30 L	1	1	40, 95
				II	POISON	T14	None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Mercury based pesticides, solid, toxic, n.o.s..	6.1	UN2777	I	POISON		None	211	242	5 kg	100 kg	1,2	1,2	40, 95
				II	POSION		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34, 40
	Mercury benzoate	6.1	UN1631	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Mercury bisulfate	6.1	UN1633	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Mercury bromides	6.1	UN1634	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Mercury compounds, liquid, n.o.s.	6.1	UN2024	I	POISON		None	201	243	1 L	30 L	1,2	1	40, 95
				II	POISON		None	202	243	5 L	60 L	1,2	1	40, 95
				III	POISON		153	203	241	60 L	220 L	1,2	1	34, 40
	Mercury compounds, solid, n.o.s.	6.1	UN2025	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
A	Mercury *contained in manufactured articles*	8	UN2809	I	CORROSIVE		None	164	None	No limit	No limit	1,2	1	40
E	Mercury cyanide (*RQ-1/0.454*)	6.1	UN1636	II	POISON	N74, N75	None	212	242	25 kg	100 kg	1,2	1,2	26, 95
	Mercury fulminate, wetted *with not less than 20 per cent water, or mixture of alcohol and water, by weight.*	1.1A	UN0135											
	Mercury gluconate	6.1	UN1637	II	POISON		None	212	242	25 kg	25 kg	a82	1,2	95
	Mercury iodide aquabasic ammonobasic (Iodide of Millon's base).	Forbidden												
	Mercury iodide, *solid*	6.1	UN1638	II	POISON		None	212	242	25 kg	25 kg	1,2	1,2	95
	Mercury iodide, *solution*	6.1	UN1638	II	POISON		None	202	243	5 L	60 L	1,2	1,2	95
	Mercury *metallic*	8	UN2809	III	CORROSIVE		None	164	None	2.5 L	2.5 L	1,2	1	40, 97
	Mercury nitride	Forbidden												
	Mercury nucleate	6.1	UN1639	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Mercury oxide	6.1	UN1641	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Mercury oxycyanide	Forbidden												
	Mercury oxycyanide, desensitized	6.1	UN1642	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	26, 95
	Mercury potassium iodide	6.1	UN1643	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Mercury salicylate	6.1	UN1644	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
E	Mercury thiocyanate (*RQ-10/4.54*)	6.1	UN1646	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Mesityl oxide	3	UN1229	II	FLAMMABLE LIQUID.	B1, T1	None	202	242	5 L	60 L	1,3	1	
	Metal alkyl halides, n.o.s.	4.2	UN3049	I	SPONTANEOUSLY COMBUSTIBLE.	B11	None	181	244	Forbidden	Forbidden	1	5	
	Metal alkyl hydrides, n.o.s.	4.2	UN3050	I	SPONTANEOUSLY COMBUSTIBLE.	B11	None	181	244	Forbidden	Forbidden	1	5	
	Metal alkyls, n.o.s.	4.2	UN2003	I	SPONTANEOUSLY COMBUSTIBLE.	B11	None	181	244	Forbidden	Forbidden	1	5	
D	Metal alkyl, solution, n.o.s.	3	NA9195	II	FLAMMABLE LIQUID.		150	202	242	1 L	4 L	1,3	1	
	Metaldehyde	4.1	UN1332	III	FLAMMABLE SOLID.	A1	151	213	240	25 kg	100 kg	1,3	1,3	
	Metal salts of methyl nitramine (dry)	Forbidden												
	Methacrylaldehyde	3	UN2396	II	FLAMMABLE LIQUID, POISON.	T8	None	202	243	1 L	60 L	1,3	5	12, 40
	Methacrylic acid, inhibited	8	UN2531	III	CORROSIVE	T8	154	203	241	5 L	60 L	1,3	1,3	82, 12
	Methacrylonitrile, inhibited	6.1	UN3079	I	POISON, FLAMMABLE LIQUID.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,3	1	21
	Methallyl alcohol	3	UN2614	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1,3	
	Methane and hydrogen, mixtures, see Hydrogen and methane, mixtures, *etc.*.													
	Methane, compressed *or* Natural gas, compressed (*with high methane content*).	2.1	UN1971		FLAMMABLE GAS.	B13	306	302	244	Forbidden	150 kg	1,3	5	40, 85
	Methane, refrigerated liquid *or* Natural gas, refrigerated liquid (*with high methane content*) (*cryogenic liquid*).	2.1	UN1972		FLAMMABLE GAS.		None	316	318, 319	Forbidden	Forbidden	1	5	40
	Methanol *or* Methyl alcohol	3	UN1230	II	FLAMMABLE LIQUID, POISON.	T8	None	202	243	1 L	60 L	1,3	1	40
	Methazoic acid	Forbidden												
DE	Methoxychlor (*RQ-1/0.454*)	ORM-E	NA2761	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Methoxymethyl isocyanate	3	UN2605	I	FLAMMABLE LIQUID, POISON.	B14, B30, 10.	None	226	244	Forbidden	Forbidden	1	5	12, 40, 48
	4-Methoxy-4-methylpentan-2-one	3	UN2293	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Methyl acetate	3	UN1231	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Methyl acetone	3	UN1232	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Methyl acetylene and propadiene mixtures, stabilized.	2.1	UN1060		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	Methyl acrylate, inhibited	3	UN1919	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,2	1	40
	Methylal	3	UN1234	II	FLAMMABLE LIQUID.	T14	None	202	242	Forbidden	60 L	1,3	5	12
	Methyl alcohol, *see* Methanol													
	Methyl allyl chloride	3	UN2554	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	5	12, 40
E	Methylamine, anhydrous (*RQ-1000/454*)	2.3	UN1061	II	POISON GAS, FLAMMABLE GAS.	B33, 10	None	304	314, 315	Forbidden	Forbidden	1,3	5	40
E	Methylamine, aqueous solution (*RQ-1000/454*).	3	UN1235	II	FLAMMABLE LIQUID.	B1, T8	150	202	242	5 L	60 L	1,3	5	12, 41
	Methylamine dinitramine and dry salts thereof.	Forbidden												
	Methylamine nitroform	Forbidden												
	Methylamine perchlorate (dry)	Forbidden												
	Methylamyl acetate	3	UN1233	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Methyl amyl ketone, see Amyl methyl ketone.													
	N-Methylaniline	6.1	UN2294	III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	1,2	95
	Methyl benzoate	6.1	UN2938	III	KEEP AWAY FROM FOOD.	T1	153	203	240	60 L	220 L	1,2	1,2	
	alpha-Methylbenzyl alcohol	6.1	UN2937	III	KEEP AWAY FROM FOOD.	T1	153	203	241	60 L	220 L	1,2	1,2	
	Methyl bromide	2.3	UN1062	IB	POISON GAS	B13, B14, B31, 10.	None	193	244	Forbidden	Forbidden	1,3	5	40, 81, 85, 95
	Methyl bromide and chloropicrin mixtures with more than 2 per cent chloropicrin, see Chloropicrin and methyl bromide mixtures.													
	Methyl bromide and chloropicrin mixtures with not more than 2 per cent chloropicrin, see Methyl bromide.													
E	Methyl bromide and ethylene dibromide mixtures, liquid (*RQ-1000/454*).	6.1	UN1647	I	POISON	B13, B14, B32, N65, 10.	None	227	244	Forbidden	Forbidden	1	1	40, 95
	Methyl bromoacetate	6.1	UN2643	II	POISON	T8	None	202	243	5 L	60 L	1	5	12, 40, 95

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	3-Methyl butan-2-one	3	UN2397	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	3-Methyl-1-butene	3	UN2561	I	FLAMMABLE LIQUID.	T20	None	201	243	1 L	30 L	1,3	5	
	2-Methyl-1-butene	3	UN2459	I	FLAMMABLE LIQUID.	T14	None	201	243	Forbidden	30 L	1,3	5	12, 40
	2-Methyl-2-butene	3	UN2460	II	FLAMMABLE LIQUID.	T14	None	202	242	5 L	60 L	1,3	5	12
	N-Methylbutylamine	3	UN2945	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Methyl-tert-butylether	3	UN2398	II	FLAMMABLE LIQUID.	T14	150	202	242	5 L	60 L	1,3	1	12
	Methyl butyrate	3	UN1237	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Methyl chloride	2.3	UN1063	II	POISON GAS, FLAMMABLE GAS.	B13, B14, B33, 10.	None	304	244	Forbidden	Forbidden	1,3	5	40, 85, 95
	Methyl chloride and chloropicrin mixtures, see Chloropicrin and methyl chloride mixtures.													
	Methyl chloride and methylene chloride mixture.	2.1	UN1912		FLAMMABLE GAS.	B13, B38	306	304	244	Forbidden	150 kg	1,3	5	40, 85
	Methyl chloroacetate	6.1	UN2295	II	POISON, FLAMMABLE LIQUID.	T11	None	202	243	5 L	60 L	1,3	1,3	95
	Methyl chlorocarbonate, see Methyl chloroformate.													
	Methyl chloroform, see 1,1,1-Trichloroethane.													
	Methyl chloroformate	3	UN1238	I	FLAMMABLE LIQUID, POISON, CORROSIVE.	B6, B14, B32, N1, N11, N26, N34, 10.	None	227	244	Forbidden	Forbidden	1,3	5	40
	Methylchloromethyl ether	3	UN1239	I	FLAMMABLE LIQUID, POISON.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1	5	12, 40
	Methyl-2-chloropropionate	3	UN2933	III	FLAMMABLE LIQUID.	B1, T7	150	203	242	60 L	220 L	1,3	1,3	
	Methyl chlorosilane	3	UN2534	I	FLAMMABLE LIQUID, POISON, CORROSIVE.	A2, B14, B30, NI, N15, N26, N34, 10.	None	226	244	Forbidden	Forbidden	1,3	1	40

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Methyl cyanide	3	UN1648	II	FLAMMABLE LIQUID, POISON.	T14	None	202	243	1 L	60 L	1,3	1	40
	Methyl cyclohexane	3	UN2296	II	FLAMMABLE LIQUID.	B1, T1	150	202	242	5 L	60 L	1,3	1	
	Methyl cyclohexanols, *flash point not more than 60.5 degrees C.*	3	UN2617	III	FLAMMABLE LIQUID.	B1, T2	150	203	242	60 L	220 L	1,3	1,3	
	Methyl cyclohexanone	3	UN2297	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Methylcyclohexanone peroxide(s) *not more than 67 per cent in solution with not more than 9 per cent available oxygen.*	5.2	UN3046	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 19, 25, 40
	Methyl cyclopentane	3	UN2298	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Methyl dichloroacetate	6.1	UN2299	III	KEEP AWAY FROM FOOD.	T1	153	203	241	60 L	220 L	1,2	1,2	34, 40
D	Methyldichloroarsine	2.3	NA1556	II	POISON GAS	B14, B32, 10.	None	192	244	Forbidden	Forbidden	1	5	40, 95
	Methyldichlorosilane	4.3	UN1242	I	DANGEROUS WHEN WET, CORROSIVE, POISON, FLAMMABLE LIQUID.	A2, B6, B14, B32, N1, N15, N26, N34, 10.	None	227	244	Forbidden	Forbidden	1	5	21, 40, 49, 91
	Methylene chloride, see Dichloromethane													
	Methylene glycol dinitrate	Forbidden												
D	Methylene isocyanate	6.1	NA2929	I	POISON, FLAMMABLE LIQUID.	B14, B30, 10.	None	226	244	Forbidden	Forbidden	L2	1	
	Methyl ethyl ether see Ethyl methyl ether													
	Methyl ethyl ketone, *see* Ethyl methyl ketone.													
	Methyl ethyl ketone peroxide, in solution with more than 9 per cent by weight active oxygen.	Forbidden												
	Methyl ethyl ketone peroxide(s), *not more than 40% in diiso-butylnylonate, with not more than 8.2% available oxygen.*	5.2	UN3068	I	ORGANIC PEROXIDE.		None	255	None	Forbidden	5 L	1	5	
	Methyl ethyl ketone peroxide(s), *not more than 60 per cent in solution and not more than 9 per cent by weight active oxygen.*	5.2	UN2127	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Methyl ethyl ketone peroxide(s), *not more than 50 per cent in solution and not more than 9 per cent by weight active oxygen.*	5.2	UN2550	I	ORGANIC PEROXIDE.		None	225	None	1 L	5 L	1	5	12, 40

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	2-Methyl-5-ethyl pyridine	6.1	UN2300	III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Methyl fluoride	2.1	UN2454		FLAMMABLE GAS.	B13	306	304	244	Forbidden	150 kg	1,3	5	40, 85
	Methyl formate	3	UN1243	I	FLAMMABLE LIQUID.	T20	150	201	243	Forbidden	30 L	1,3	5	12
	2-Methylfuran	3	UN2301	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	5	12
	a-Methylglucoside tetranitrate	Forbidden												
	a-Methylglycerol trinitrate	Forbidden												
	5-Methylhexan-2-one	3	UN2302	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Methylhydrazine	3	UN1244	I	FLAMMABLE LIQUID, CORROSIVE.	B14, B32, N15, N34, 10.	None	227	244	Forbidden	Forbidden	1,3	5	49
	Methyl iodide	6.1	UN2644	II	POISON	T14	None	202	243	5 L	60 L	1,3	1,3	12, 40, 95
	Methyl isobutyl carbinol	3	UN2053	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Methyl isobutyl ketone	3	UN1245	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Methyl isobutyl ketone peroxide, in solution with more than 9 per cent by weight active oxygen.	Forbidden												
	Methyl isobutyl ketone peroxide(s), *not more than 62 per cent in solution and not more than 9 per cent by weight active oxygen.*	5.2	UN2126	I	ORGANIC PEROXIDE.		None	225	None	1 L	5 L	1	5	12, 40
	Methyl isocyanate *or* Methyl isocyanate solutions.	3	UN2480	I	FLAMMABLE LIQUID, POISON.	B14, B30, N15, N26, 10.	None	226	244	Forbidden	Forbidden	1	5	12, 40, 48
	Methyl isopropenyl ketone, inhibited	3	UN1246	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	
	Methyl isothiocyanate	3	UN2477	I	FLAMMABLE LIQUID, POISON.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1	1,3	12, 40, 48, 95
	Methyl isovalerate	3	UN2400	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Methyl magnesium bromide, in ethyl ether	4.3	UN1928	I	DANGEROUS WHEN WET.	N15	None	201	243	Forbidden	15 kg	1	5	
E	Methyl mercaptan (*RQ-100/45.4*)	2.3	UN1064	1B	POISON GAS, FLAMMABLE GAS.	B14, B31, 10.	None	304	314, 315	Forbidden	Forbidden	1,3	1	40, 85, 95
E	Methyl methacrylate monomer, inhibited (*RQ-5000/2270*).	3	UN1247	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	40

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Methylmorpholine	3	UN2535	II	FLAMMABLE LIQUID, CORROSIVE.	B6, T8	None	202	243	1 L	5 L	1,3	1	40
	Methyl nitramine (dry)	Forbidden												
	Methyl nitrite	Forbidden												
	Methyl norbornene dicarboxylic anhydride, see Corrosive liquids, n.o.s..													
	Methyl orthosilicate	3	UN2606	I	FLAMMABLE LIQUID, POISON.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,3	5	12, 40
DE	Methyl parathion (*RQ-100/45.4*) *liquid*	6.1	NA2783	II	POISON	N76	None	202	243	Forbidden	1 L	1,3	1,3	
DE	Methyl parathion (*RQ-100/45.4*) *solid*	6.1	NA2783	II	POISON	N77	None	212	242	25 kg	100 kg	1,2	1,2	
	Methylpentadiene	3	UN2461	II	FLAMMABLE LIQUID.	T7	150	202	241	5 L	60 L	1,3	5	12
	Methylpentanes, see Hexanes													
	2-Methylpentan-2-ol	3	UN2560	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Methylphenyldichlorosilane	3	UN2437	II	FLAMMABLE LIQUID.	T8, T26	150	202	242	5 L	60 L	1	1	13, 40
D	Methyl phosphonic dichloride	8	NA9206	I	CORROSIVE, POISON.	B8, B25, B32, N1, N15, N34, N43, 10.	None	227	244	Forbidden	Forbidden	1	1	
	Methyl phosphonothioic dichloride, anhydrous, see Corrosive liquid, n.o.s..													
D	Methyl phosphonous dichloride, *pyrophoric liquid*.	6.1	NA2845	I	POISON, SPONTANEOUSLY COMBUSTIBLE, CORROSIVE.	B8, B14, B16, B32, 10.	None	181	244	Forbidden	Forbidden	1	5	18
	Methyl picric acid (heavy metal salts of)	Forbidden												
	1-Methylpiperidine	3	UN2399	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Methyl propionate	3	UN1248	II	FLAMMABLE LIQUID.	T2	150	202	242	5 L	60 L	1,3	1	
	Methyl propyl ether	3	UN2612	II	FLAMMABLE LIQUID.	T14	150	202	242	5 L	60 L	1,3	5	12, 40
	Methyl propyl ketone	3	UN1249	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Methyl sulfate, see Dimethyl sulfate													
	Methyl sulfide, see Dimethyl sulfide													
	Methyltetrahydrofuran	3	UN2536	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Methyl trichloroacetate	6.1	UN2533	III	KEEP AWAY FROM FOOD.	T1	153	203	241	60 L	220 L	1,2	1,2	34
	Methyltrichlorosilane	3	UN1250	I	FLAMMABLE LIQUID, POISON, CORROSIVE.	B6, B14, B32, N26, N34, 10.	None	227	244	Forbidden	Forbidden	1,3	1	40
	Methyl trimethylol methane trinitrate	Forbidden												
	alpha-Methyl valeraldehyde	3	UN2367	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Methyl vinyl ketone *inhibited*	3	UN1251	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
DE	Mevinphos (*liquid*)	6.1	NA2783	I	POISON	N76	None	201	243	Forbidden	1 L	1,2	5	
				II	POISON	N76	None	202	243	0.5 L	30 L	1,2	5	
				III	KEEP AWAY FROM FOOD.	N76	153	203	241	60 L	220 L	1,2	1,2	
DE	Mevinphos (*solid*)	6.1	NA2783	I	POISON	N77	None	211	242	Forbidden	100 kg	1,2	5	
				II	POISON	N77	None	212	242	1 kg	200 kg	1,2	5	
				III	KEEP AWAY FROM FOOD.	N77	153	213	240	100 kg	200 kg	1,2	1,2	
DE	Mexacarbate (*RQ-1000/454*)	6.1	NA2757	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
	Mine rescue equipment containing carbon dioxide, see Carbon dioxide.													
	Mines *with bursting charge*	1.1F	UN0136											
	Mines *with bursting charge*	1.1D	UN0137											
	Mines *with bursting charge*	1.2D	UN0138											
	Mines *with bursting charge*	1.2F	UN0294											
	Mixed acid, see Nitrating acid, mixtures													
AW	Molybdenum pentachloride	8	UN2508	III	CORROSIVE	T8, T26	154	213	240	25 kg	100 kg	1	1	60, 40
	Monochloroacetone (unstabilized)	Forbidden												
	Monochloroethylene, see Vinyl chloride													
	Monoethanolamine, see Ethanolamine													
	Monoethylamine, see Ethylamine													
	Morpholine	3	UN2054	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Morpholine, aqueous, mixture, see Corrosive liquid, n.o.s.													
	Motorcycles, see Vehicles, self-propelled													
	Motor fuel anti-knock mixtures	6.1	UN1649	I	POISON	B11, B12, B14, T26, T39.	None	201	244	Forbidden	30 L	1	5	22, 40, 95
	Motor spirit, *see* Gasoline													
	Motor vehicle, see Vehicles, self-propelled													
	Muriatic acid, see Hydrochloric acid solution.													

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Musk xylene, *see* 5-tert-Butyl2,4,6-trinitro-m-xylene.													
DE	Naled (*RQ-10/4.54*)	ORM-E	NA2783	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Naphtha	3	UN2553	II	FLAMMABLE LIQUID.	T8, T31	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1	
E	Naphthalene, crude *or* refined (*RQ-5000/2270*).	4.1	UN1334	III	FLAMMABLE SOLID.	A1	151	213	240	25 kg	100 kg	1,3	1,3	
	Naphthalene diozonide	Forbidden												
	Naphthalene, molten	4.1	UN2304	III	FLAMMABLE SOLID.	A1, T8, T38.	151	213	241	25 kg	100 kg	1	1	
	Naphtha, *petroleum*	3	UN1255	I	FLAMMABLE LIQUID.	T8	150	201	243	1 L	30 L	1,3	5	
				II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T8	150	203	242	60 L	220 L	1,3	1,3	
	Naphtha, *solvent*	3	UN1256	II	FLAMMABLE LIQUID.	T8, T31	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1,3	
DE	Naphthenic acid (*RQ-100/45.4*)	ORM-E	NA9137	III	None		156	203	241	No limit	No limit	1,2	1,2	
	alpha-Naphthylamine	6.1	UN2077	III	KEEP AWAY FROM FOOD.	T7	153	213	240	100 kg	200 kg	1,2	1,2	34
	beta-Naphthylamine	6.1	UN1650	II	POISON	T12, T26	None	212	242	25 kg	100 kg	1,2	1,2	95
	Naphthyl amineperchlorate	Forbidden												
	Naphthylthiourea	6.1	UN1651	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Naphthylurea	6.1	UN1652	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Natural gases (with high methane content), see Methane, *etc. (UN 1971, 1972).*													
	Natural gasoline	3	UN1257	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	5	12
	Neohexane, see Hexanes													
	Neon, compressed	2.2	UN1065		NONFLAMMABLE GAS.	B13	306	302	244	75 kg	150 kg	1,3	1,3	85
	Neon, refrigerated liquid (*cryogenic liquid*)	2.2	UN1913		NONFLAMMABLE GAS.	B13	320	320	244	50 kg	500 kg	1,3	1	85
	New explosive or explosive device. See 173.51 and 173.86.													
DE	Nickel ammonium sulfate (*RQ-5000/2270*)	ORM-E	NA9136	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Nickel carbonyl	6.1	UN1259	I	POISON, FLAMMABLE LIQUID.	B14, B30, 10.	None	198	244	Forbidden	Forbidden	1	5	18, 21, 40, 95

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or rail car	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Nickel catalyst, dry	4.2	UN2881	I	SPONTANEOUSLY COMBUSTIBLE.	N15, N34	None	211	None	Forbidden	Forbidden	1,3	1	
	Nickel catalyst, wetted *with not less than 40 per cent water or other suitable liquid, by weight, finely divided, activated or spent.*	4.2	UN1378	II	SPONTANEOUSLY COMBUSTIBLE.	A2, N2, N15, N34.	None	212	None	Forbidden	50 kg	1,3	1	
DE	Nickel chloride (*RQ-5000/2270*)	ORM-E	NA9139	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Nickel cyanide	6.1	UN1653	II	POISON	N74, N75	None	212	242	25 kg	100 kg	1,2	1,2	26, 95
DE	Nickel hydroxide (*RQ-1000/454*)	ORM-E	NA9140	III	None		156	213	240	No limit	No limit	1,2	1,2	
E	Nickel nitrate (*RQ-5000/2270*)	5.1	UN2725	III	OXIDIZER	A1	152	213	240	25 kg	100 kg	1,2	1,2	
	Nickel nitrite	5.1	UN2726	III	OXIDIZER	A1	152	213	240	25 kg	100 kg	1,2	1,2	34, 56, 58
	Nickel picrate	Forbidden												
DE	Nickel sulfate (*RQ-5000/2270*)	ORM-E	NA9141	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Nicotine	6.1	UN1654	II	POISON		None	202	243	Forbidden	60 L	1,2	1	95
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34
	Nicotine compounds, n.o.s. *or* Nicotine preparations, n.o.s. *liquid.*	6.1	UN1655	I	POISON		None	201	243	1 L	30 L	1,2	1,2	95
				II	POISON		None	202	243	5 L	60 L	1,2	1,2	95
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34
	Nicotine compounds, n.o.s. *or* Nicotine preparations, n.o.s. *solid.*	6.1	UN1655	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Nicotine hydrochloride *or* Nicotine hydrochloride solution.	6.1	UN1656	II	POISON		None	202	243	5 L	60 L	1,2	1,2	95
	Nicotine salicylate	6.1	UN1657	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Nicotine sulfate, solid	6.1	UN1658	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Nicotine sulfate, solution	6.1	UN1658	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	95
	Nicotine tartrate	6.1	UN1659	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Nitrated paper (unstable)	Forbidden												
	Nitrates, inorganic, n.o.s.	5.1	UN1477	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	46
	Nitrates of diazonium compounds	Forbidden												
E	Nitrating acid mixtures, spent *with more than 50 per cent nitric acid (RQ-1000/454).*	8	UN1826	I	CORROSIVE, OXIDIZER.	B28, T12, T27.	None	158	243	Forbidden	30 L	1	5	33, 40
E	Nitrating acid mixtures spent *with not more than 50 per cent nitric acid (RQ-1000/454).*	8	UN1826	II	CORROSIVE	B2, B28, T12, T27.	None	158	242	Forbidden	30 L	1	5	33, 40
E	Nitrating acid mixtures *with more than 50 per cent nitric acid (RQ-1000/454).*	8	UN1796	I	CORROSIVE, OXIDIZER.	B28, T12, T27.	None	158	243	Forbidden	2.5 L	1	5	33, 40

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
E	Nitrating acid mixtures *with not more than 50 per cent nitric acid (RQ-1000/454).*	8	UN1796	II	CORROSIVE	B2, B26, T12, T27.	None	158	242	Forbidden	30 L	1	5	33, 40
E	Nitric acid, *other than red fuming, with more than 70 per cent nitric acid (RQ-1000/454).*	8	UN2031	I	CORROSIVE	B4, B12, B17, B28, T9, T27.	None	158	242	Forbidden	2.5 L	1	5	33, 37, 38, 63
E	Nitric acid, *other than red fuming, with not more than 70 per cent nitric acid (RQ-1000/454).*	8	UN2031	II	CORROSIVE	B2, B12, B17, B26, T9, T27.	None	158	242	Forbidden	30 L	1	5	33, 37, 38, 63
E	Nitric acid, red fuming *(RQ-1000/454)*	8	UN2032	I	CORROSIVE, OXIDIZER, POISON.	B17, B28, B30, 10.	None	158	244	Forbidden	Forbidden	1	5	33, 37, 38, 40, 63
	Nitric ether. See Ethyl nitrate													
	Nitric oxide	2.3	UN1660	IB	POISON GAS	B7, B14, B28, B31, B37, 10.	None	337	244	Forbidden	Forbidden	1	5	40, 95
	Nitric oxide and nitrogen tetroxide mixtures	2.3	UN1975	IA	POISON GAS, OXIDIZER.	10	None	337	245	Forbidden	Forbidden	1	5	40, 43, 95
	Nitrites, inoganic, n.o.s.	5.1	UN2627	II	OXIDIZER	A33	152	212	None	5 kg	25 kg	1,2	1,2	34, 46, 56, 58
	N-Nitroaniline	Forbidden												
	Nitroanilines (*o-,m-,p-*)	6.1	UN1661	II	POISON	T14	None	212	242	25 kg	100 kg	1,2	1,2	95
	Nitroanisole	6.1	UN2730	III	KEEP AWAY FROM FOOD.	T8	153	203	241	60 L	220 L	1,3	1,3	12, 34
E	Nitrobenzene *(RQ-1000/454)*	6.1	UN1662	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	40, 95
	m-Nitrobenzene diazonium perchlorate	Forbidden												
	Nitrobenzenesulfonic acid	8	UN2305	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	
	Nitrobenzol, see Nitrobenzene													
	5-Nitrobenzotriazol	1.1D	UN0385											
	Nitrobenzotrifluorides	6.1	UN2306	II	POISON	T8	None	202	243	5 L	60 L	1,2	1,2	40, 95
	Nitrobromobenzene	6.1	UN2732	III	KEEP AWAY FROM FOOD.	T8, T38	153	203	241	60 L	220 L	1,3	1,3	12, 95
	Nitrocellulose, *dry or wetted with less than 25 per cent water (or alcohol), by weight.*	1.1D	UN0340											
	Nitrocellulose, plasticized *with not less than 18 per cent plasticizing substance, by weight.*	1.3C	UN0343											
	Nitrocellulose, solution, flammable *with not more than 12.6 per cent nitrogen, by weight, and not more than 55 per cent nitrocellulose, flash point less than 23 degrees C.*	3	UN2059	II	FLAMMABLE LIQUID.	A32, T9	150	202	242	5 L	60 L	1,3	1	

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Nitrocellulose, solution, flammable *with not more than 12.6 per cent nitrogen, by weight, and not more than 55 per cent nitrocellulose, flash point not less than 23 degrees C but not more than 60.5 degrees C.*	3	UN2060	II	FLAMMABLE LIQUID.	A32, T9	150	202	242	5 L	60 L	1,3	1	
	Nitrocellulose, *unmodified or plasticized with less than 18 per cent plasticizing substance, by weight.*	1.1D	UN0341											
	Nitrocellulose, wetted *with not less than 25 per cent alcohol, by weight.*	1.3C	UN0342											
	Nitrocellulose with alcohol, *not less than 25 per cent by weight, and not more than 12.6 per cent nitrogen, by dry weight.*	4.1	UN2556	II	FLAMMABLE SOLID.		151	212	None	1 kg	15 kg	1	5	25
	Nitrocellulose with plasticizing substance, *not less than 18 per cent, by weight, and not more than 12.6 per cent nitrogen, by dry weight.*	4.1	UN2557	II	FLAMMABLE SOLID.		151	212	None	1 kg	15 kg	1	5	25
	Nitrocellulose with water, *not less than 25 per cent, by weight.*	4.1	UN2555	II	FLAMMABLE SOLID.		151	212	None	15 kg	50 kg	1,3	5	25
	Nitrochlorobenzene, see Chloronitrobenzenes.													
	3-Nitro-4-chlorobenzotrifluoride	6.1	UN2307	II	POISON	T8	None	202	243	5 L	60 L	1,2	1,2	40, 95
	Nitrocresols	6.1	UN2446	III	KEEP AWAY FROM FOODS.		153	213	240	100 kg	200 kg	1,2	1,2	34
	6-Nitro-4-diazotoluene-3-sulfonic acid (dry)	Forbidden												
	Nitroethane	3	UN2842	III	FLAMMABLE LIQUID.	T8	150	203	242	60 L	220 L	1,3	1,3	
	Nitroethylene polymer	Forbidden												
	Nitroethyl nitrate	Forbidden												
	Nitrogen, compressed	2.2	UN1066		NONFLAMMABLE GAS.		306	302	314, 315	75 kg	150 kg	1,3	1,3	85
E	Nitrogen dioxide, liquefied (*RQ-1000/454*)	2.3	UN1067	IA	POISON GAS, OXIDIZER.	10	None	336	245	Forbidden	Forbidden	1	5	40, 43, 95
	Nitrogen fertilizer solution, see Fertilizer ammoniating solution *etc.*.													
	Nitrogen, mixtures with rare gases, see Rare gases and nitrogen mixtures.													
	Nitrogen peroxide, see Nitrogen dioxide, liquified.													
	Nitrogen, refrigerated liquid (*cryogenic liquid*).	2.2	UN1977		NONFLAMMABLE GAS.		320	316	318	50 kg	500 kg	1,3	1,3	85
	Nitrogen tetroxide, see Nitrogen dioxide, liquefied.													

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Nitrogen tetroxide and nitric oxide mixtures, see Nitric oxide and nitrogen tetroxide mixtures.													
	Nitrogen trichloride	Forbidden												
	Nitrogen trifluoride	2.3	UN2451	III	POISON GAS	B13, B14, B34, 10.	None	302	244	Forbidden	Forbidden	1	5	40, 43, 95
	Nitrogen triiodide	Forbidden												
	Nitrogen triiodide monoamine	Forbidden												
	Nitrogen trioxide	2.3	UN2421	IB	POISON GAS, OXIDIZER.	B13, 10	None	336	245	Forbidden	Forbidden	1	5	31, 40, 95
	Nitroglycerin, desensitized *with not less than 40 per cent non-volatile water insoluble phlegmatizer, by weight.*	1.1D	UN0143											
	Nitroglycerin (Glyceryl trinitrate) solution in alcohol *with not more than 1 per cent nitroglycerin.*	3	UN1204	II	FLAMMABLE LIQUID.	N34, T25	None	202	None	5 L	60 L	1,3	1	
	Nitroglycerin, liquid, not desensitized	Forbidden												
	Nitroglycerin, solution in alcohol, *with more than 1% but not greater than 5% nitroglycerin.*	3	UN3064	II	FLAMMABLE LIQUID.		None	202	None	Forbidden	Forbidden			
	Nitroglycerin, spirit of, *with more than 1 per cent but not more than 10 per cent nitroglycerin in solution in alcohol.*	1.1D	UN0144											
	Nitroguanidine nitrate	Forbidden												
	Nitroguanidine (Picrite), *dry or wetted with less than 20 per cent water, by weight.*	1.1D	UN0282											
	Nitroguanidine (Picrite), wetted *with not less than 20 per cent water, by weight.*	4.1	UN1336	I	FLAMMABLE SOLID.	A19, A20, N2, N34, N41.	None	211	None	1 kg	15 kg	1,3	5	
	1-Nitrohydantoin	Forbidden												
E	Nitrohydrochloric acid (*RQ-1000/454*)	8	UN1798	I	CORROSIVE	B4, N1, N15, N34, N41, T18, T27.	None	201	242	Forbidden	2.5 L	1	5	33, 40
	Nitro isobutane triol trinitrate	Forbidden												
	Nitromannite (dry)	Forbidden												
	Nitromannite, wetted, *see* Mannitol hexanitrate, *etc.*													

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Nitromethane	3	UN1261	II	FLAMMABLE LIQUID.	T25	150	202	None	Forbidden	60 L	1,3	1,3	
	N-Nitro-N-methylglycolamide nitrate	Forbidden												
	2-Nitro-2-methylpropanol nitrate	Forbidden												
	Nitromuriatic acid, see Nitrohydrochloric acid.													
	Nitronaphthalene	4.1	UN2538	III	FLAMMABLE SOLID.	A1	151	213	240	25 kg	100 kg	1,3	1,3	
E	Nitrophenols (*o-,m-,p-*) (*RQ-1000/454*)	6.1	UN1663	III	KEEP AWAY FROM FOOD.	T8, T38	153	213	240	100 kg	200 kg	1,2	1,2	34
	m-Nitrophenyldinitro methane	Forbidden												
	Nitropropanes	3	UN2608	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	p-Nitrosodimethylaniline	4.2	UN1369	II	SPONTANEOUSLY COMBUSTIBLE.	A19, A20, N34.	None	212	241	15 kg	50 kg	1,3	5	34
	Nitrostarch, *dry or wetted with less than 20 per cent water, by weight.*	1.1D	UN0146											
	Nitrostarch, wetted *with not less than 20 per cent water, by weight.*	4.1	UN1337	I	FLAMMBLE SOLID.	A19, A20, N2, N34, N41.	None	211	None	1 kg	15 kg	1	5	
	Nitrosugars (dry)	Forbidden												
	Nitrosyl chloride	2.3	UN1069	II	POISON GAS, CORROSIVE.	10	None	304	245	Forbidden	Forbidden	1	5	40, 95
	Nitrosylsulfuric acid	8	UN2308	II	CORROSIVE	B2, N1, N11, N26, N34, T9, T27.	154	202	242	1 L	30 L	1	5	40, 43
E	Nitrotoluenes, *liquid* (*RQ-1000/454*), *o-*	6.1	UN1664	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	95
E	Nitrotoluenes, *solid* (*RQ-1000/454*) *m-* or *p-*.	6.1	UN1664	II	POISON	T14	None	212	242	25 kg	100 kg	1,2	1,2	95
	Nitrotoluidines (mono)	6.1	UN2660	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Nitro urea	1.1.D	UN0147											
	Nitrous oxide and carbon dioxide mixtures, see Carbon dioxide and nitrous oxide mixtures.													
	Nitrous oxide, compressed	2.3	UN1070	II	POISON GAS, OXIDIZER.	B13, B33, 10.	None	304	244	Forbidden	Forbidden	1,3	1,3	40, 85
	Nitrous oxide, refrigerated liquid	2.3	UN2201	II	POISON GAS, OXIDIZER.	B6, B14, B33, 10.	None	316	314, 315	Forbidden	Forbidden	1,3	1	40, 85
	Nitroxylenes (*o-,m-,p-*)	6.1	UN1665	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	95
	Nitroxylol, see Nitroxylenes.													

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Nonanes	3	UN1920	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Nonflammable gas, n.o.s., see Compressed *or* Liquefied gases, *e tc. (UN 1955, 1956).*													
	Nonliquefied gases, see Compressed gases, *etc.*.													
	Nonliquefied hydrocarbon gas, see Hydrocarbon gases, compressed, n.o.s..													
	Nonyltrichlorosilane	8	UN1799	II	CORROSIVE	B2, B6, N26, N34, T8, T26.	None	202	242	Forbidden	30 L	1	1	40
	2,5 Norbornadiene	3	UN2251	II	FLAMMABLE LIQUID.		150	202	241	5 L	60 L	1	5	12
	Nordhausen acid, see Sulfuric acid, fuming													
	Octadecyltrichlorosilane	8	UN1800	II	CORROSIVE	B2, B6, N26, N34, T8.	None	202	242	Forbidden	30 L	1	1	40
	Octadiene	3	UN2309	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	1,7-Octadine-3,5-diyne-1,8-dimethoxy-9-octadecynoic acid.	Forbidden												
	Octafluorobut-2-ene	2.2	UN2422		NONFLAMMABLE GAS.	B13	None	304	244	75 kg	150 kg	1,3	1,3	85
	Octafluorocyclobutane	2.2	UN1976		NONFLAMMABLE GAS.	B13	None	304	244	75 kg	150 kg	1,3	1,3	85
	Octafluoropropane	2.2	UN2424		NONFLAMMABLE GAS.	B13	None	304	244	75 kg	150 kg	1,3	1,3	85
	Octanes	3	UN1262	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	n-Octanoyl peroxide, *see* Di-n-octanoyl peroxide, *technically pure.*													
	Octogen, *see* Cyclotetramethylene tetranitramine, etc..													
	Octol, *see* Octolite, *etc.*													
	Octolite (Octol), *dry or wetted with less than 15 per cent water, by weight.*	1.1D	UN0266											
	Octyl aldehydes, *flammable*	3	UN1191	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	tert-Octylmercaptan	6.1	UN3023	I	POISON, FLAMMABLE LIQUID.	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1,2	1,2	21, 40
	Octyltrichlorosilane	8	UN1801	II	CORROSIVE	B2, B6, N26, N34, T8, T26.	None	202	242	Forbidden	30 L	1	1	40
	Oil gas	2.1	UN1071		FLAMMABLE GAS.	B13	None	304	244	Forbidden	150 kg	1	5	40

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***) Exceptions	Non-bulk packaging	Bulk packaging	(9) Quantity limitations Passenger aircraft or railcar	Cargo aircraft only	(10) Vessel stowage requirements Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Oleum, see Sulfuric acid, fuming													
	Organic peroxides, mixtures	5.2	UN2756	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Organic peroxides, samples, n.o.s.	5.2	UN2255	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Organic peroxides, trial quantities, n.o.s.	5.2	UN2899	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
D	Organic phosphate, Organic phosphate compound, *or* Organic phosphorus compound; mixed with compressed gas.	2.3	NA1955	IB	POISON GAS	10	None	334	None	Forbidden	Forbidden	1	5	40, 95
	Organochlorine pesticides liquid, flammable, toxic, n.o.s., *flash point less than 23 degrees C.*	3	UN2762	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	5	
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	
	Organochlorine pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23 degrees C.*	6.1	UN2995	I	POISON, FLAMMABLE LIQUID.	T42	None	201	243	1 L	30 L	1	1	23, 40, 95
				II	POISON, FLAMMABLE LIQUID.	T14	None	202	243	5 L	60 L	1,2	1	23, 40, 95
				III	KEEP AWAY FROM FOOD.	B1, T14	153	203	242	60 L	220 L	1,2	1,2	23, 34, 40
	Organochlorine pesticides, liquid, toxic, n.o.s..	6.1	UN2996	I	POISON	T42	None	201	243	1 L	30 L	1	1	40, 95
				II	POISON	T14	None	202	242	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Organochlorine pesticides, solid toxic n.o.s.	6.1	UN2761	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	40, 95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34, 40
	Organophosphorus pesticides, liquid, flammable, toxic, n.o.s., *flash point less than 23 degrees C.*	3	UN2784	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	5	
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	
	Organophosphorus pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23 degrees C.*	6.1	UN3017	I	POISON, FLAMMABLE LIQUID.	N76, T42	None	201	243	1 L	30 L	1	1	23, 40, 95
				II	POISON, FLAMMABLE LIQUID.	N76, T14	None	202	243	5 L	60 L	1,3	1	23, 40, 95
				III	KEEP AWAY FROM FOOD.	B1, N76, T14.	153	203	242	60 L	220 L	1,3	1,3	23, 34, 40
	Organophosphorus pesticides, liquid, toxic, n.o.s..	6.1	UN3018	I	POISON	N76, T42	None	201	243	1 L	30 L	1	1	40, 95
				II	POISON	N76, T14	None	202	243	5 L	60 L	1,2	1	40, 95

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(6) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
				III	KEEP AWAY FROM FOOD.	N76, T14	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Organophosphorus pesticides, solid, toxic, n.o.s.	6.1	UN2783	I	POISON	N77	None	211	242	5 kg	50 kg	1,2	1,2	40, 95
				II	POISON	N77	None	212	242	25 kg	100 kg	1,2	1,2	40, 95
				III	KEEP AWAY FROM FOOD.	N77	153	213	240	100 kg	200 kg	1,2	1,2	34, 40
	Organotin compounds, n.o.s. *liquid*	6.1	UN2788	I	POISON	N1, N16, N33, N34.	None	201	243	1 L	30 L	1,2	1	40, 95
				II	POISON	N1, N16, N33, N34.	None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1	34, 40
	Organotin compounds, n.o.s. *solid*	6.1	UN2788	I	POISON	A2, A5, N1.	None	211	242	5 kg	50 kg	1,2	1	40, 95
				II	POISON	A1, N1	None	212	242	25 kg	100 kg	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.	A29	153	213	240	100 kg	200 kg	1,2	1,2	34, 40
	Organotin pesticides, liquid, flammable, toxic, n.o.s., *flash point less than 23deg C.*	3	UN2787	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	5	
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	
	Organotin pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23deg C.*	6.1	UN3019	I	POISON, FLAMMABLE LIQUID.		None	201	243	1 L	30 L	1	1	23, 40, 95
				II	POISON, FLAMMABLE LIQUID.		None	202	243	5 L	60 L	1,2	1	23, 40, 95
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	23, 34, 40
	Organotin pesticides, liquid, toxic, n.o.s.	6.1	UN3020	I	POISON		None	201	243	1 L	30 L	1	1	40, 95
				II	POISON		None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34, 40
	Organotin pesticides, solid, toxic, n.o.s.	6.1	UN2786	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	40, 95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34, 40
	Orthonitroaniline, see Nitroanilines etc.													
	Osmium tetroxide	6.1	UN2471	I	POISON	N2, N33, N34.	None	211	242	5 kg	50 kg	1,2	1	40, 95
	Oxalates, *water soluble*	6.1	UN2449	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
D	Oxidizing substances, liquid, corrosive, n.o.s.	5.1	NA9193	II	OXIDIZER, CORROSIVE.	B2	None	202	243	Forbidden	1 L	1	5	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Oxidizing substances, liquid, poisonous, n.o.s..	5.1	NA9199	II	OXIDIZER, POISON.		None	202	243	Forbidden	1 L	1	5	
	Oxidizing substances, n.o.s. *liquid*	5.1	UN1479	I	OXIDIZER	A2	None	201	None	Forbidden	Forbidden	1	5	40, 46, 56
				II	OXIDIZER	A2	152	202	242	1 L	5 L	1,2	1,2	40, 46, 56
				III	OXIDIZER	A2	152	203	240	5 L	60 L	1,2	1,2	40, 46, 56
	Oxidizing substances, n.o.s. *solid*	5.1	UN1479	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	
	Oxidizing substances, solid, corrosive, n.o.s..	5.1	UN3085,	I	OXIDIZER, CORROSIVE.	B10	None	211	242	1 kg	15 kg	1	4	
				II	OXIDIZER, CORROSIVE.	B10	None	212	240	5 kg	25 kg	1	4	
				III	OXIDIZER, CORROSIVE.	B10	152	213	240	25 kg	100 kg	1	4	
	Oxidizing substances, solid poisonous, n.o.s..	5.1	UN3087	I	OXIDIZER, POISON.	B10	None	211	242	1 kg	15 kg	1,2	4	
				II	OXIDIZER, POISON.	B10	None	212	240	5 kg	25 kg	1,2	4	
				III	OXIDIZER, POISON.	B10	152	213	240	25 kg	100 kg	1,2	4	
	Oxygen and carbon dioxide mixtures, see Carbon dioxide and oxygen mixtures.													
	Oxygen, compressed	2.2	UN1072		NONFLAMMABLE GAS, OXIDIZER.		306	302	314, 315	75 kg	150 kg	1,3	1,3	85
	Oxygen difluoride	2.3	UN2190	IA	POISON GAS	10	None	304	245	Forbidden	Forbidden	1	5	13, 40
	Oxygen, mixtures with rare gases, see Rare gases and oxygen mixtures.													
	Oxygen, refrigerated liquid (*cryogenic liquid*).	2.2	UN1073		NONFLAMMABLE GAS, OXIDIZER.		320	316	318	Forbidden	Forbidden	1	5	5
	Paint *or* Paint related material	3	UN1263	I	FLAMMABLE LIQUID.		150	201	243	1 L	30 L	1,3	5	
				II	FLAMMABLE LIQUID.	T7, T30	150	173	242	5 L	60 L	1,2	1	
				III	FLAMMABLE LIQUID.	T7, T30	150	173	241	60 L	220 L	1,3	5	
	Paint *or* Paint related material	8	UN3066	II	CORROSIVE	B2, N71, T7.	154	202	242	1 L	5 L	1,2	1,2	
				III	CORROSIVE	N71, T7	154	203	241	5 L	60 L	1,2	1,2	
	Paint driers, see Driers, paint *or* varnish, *etc.*.													
	Paper, unsaturated oil treated *incompletely dried* (*includes carbon paper*).	4.2	UN1379	III	SPONTANEOUSLY COMBUSTIBLE.		None	213	241	Forbidden	Forbidden	1,3	1,3	
E	Paraformaldehyde (*RQ-1000/454*)	4.1	UN2213	III	FLAMMABLE SOLID.	A1	151	213	240	25 kg	100 kg	1,3	1,3	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Paraldehyde	3	UN1264	II	FLAMMABLE LIQUID.	T1	150	202	242	60 L	220 L	1,3	1	
	Paranitroaniline, solid, see Nitroanilines *etc.*.													
DE	Parathion (*RQ-1/0.454*)	6.1	NA2783	I	POISON		None	201	243	Forbidden	1 L	1,3	1,3	
				II	POISON		None	202	243	Forbidden	5 L	1,3	1,3	
DE	Parathion and compressed gas mixture (*RQ-1/0.454*).	2.3	NA1967	IB	POISON GAS	B14, B31, 10.	None	334	244	Forbidden	Forbidden	1,3	5	40, 95
	Paris green, solid, see Copper acetoarsenite.													
DE	PCB. *See* Polychlorinated biphenyls													
	Pelargonyl peroxide, *see* Di-n-nonanoyl peroxide, *technically pure.*													
	Pentaborane	4.2	UN1380	I	SPONTANEOUSLY COMBUSTIBLE, POISON.		None	205	246	Forbidden	Forbidden	1	5	
	Pentachloroethane	6.1	UN1669	II	POISON		None	202	243	5 L	60 L	1,2	1,2	40, 95
DE	Pentachlorophenol (*RQ-10/4.54*)	ORM-E	NA2020	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Pentaerythrite tetranitrate (dry)	Forbidden												
	Pentaerythrite tetranitrate (Pentaerythritol tetranitrate; PETN) wetted *with not less than 25 per cent water, by weight, or* Pentaerythrite tetranitrate (Pentaerythritol tetranitrate ; PETN) desensitized *with not less than 15 per cent phlegmatizer by weight.*	1.1.D	UN0150											
	Pentaerythrite tetranitrate (PETN) *with not less than 7 per cent wax by weight.*	1.1D	UN0411											
	Pentaerythritol tetranitrate, *see* Pentaerythrite tetranitrate, *etc.*.													
	Pentamethylheptane	3	UN2286	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Pentan-2,4-dione	3	UN2310	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	n-Pentane *or* Isopentane	3	UN1265	I	FLAMMABLE LIQUID.	T20	150	201	243	Forbidden	30 L	1,3	5	12
	Pentanitroaniline (dry)	Forbidden												
	3-Pentanol	3	UN2706	II	FLAMMABLE LIQUID.		150	202	242	5 L	60 L	1,3	1	
	1-Pentol	8	UN2705	II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1,2	1	38
	Pentolite, *dry or wetted with less than 15 per cent water, by weight.*	1.1D	UN0151	II										
	Perchlorates, inorganic, n.o.s.	5.1	UN1481	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
	Perchloric acid *more than 50 per cent but not more than 72 per cent acid, by weight.*	5.1	UN1873	I	OXIDIZER, CORROSIVE.	A2, N1, N34, N41, T9, T27.	None	201	243	Forbidden	2.5 L	1	5	

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Perchloric acid, more than 72 per cent acid by weight.	Forbidden												
	Perchloric acid *not more than 50 per cent acid by weight.*	8	UN1802	II	CORROSIVE, OXIDIZER.	N15, N34, N41, T9.	None	202	243	Forbidden	30 L	1	1	37
	Perchloroethylene, see Tetrachloroethylene.													
	Perchloromethylmercaptan	6.1	UN1670	I	POISON	B14, B25, B32, N1, N15, N17, N26, N34, 10.	None	227	244	Forbidden	Forbidden	1	5	40, 95
	Perchloryl fluoride	2.3	UN3083	1B	POISON GAS, OXIDIZER.	B12, B14, B31, 10.	None	302	244	Forbidden	Forbidden	1	5	40, 43, 95
	Percussion caps, see Primers, cap type													
	Perfluoro-2-butene, see Octafluorobut-2-ene.													
	Perfumery products *with flammable solvents.*	3	UN1266	II	FLAMMABLE LIQUID.	T7, T30	150	202	242	15 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1,3	
	Permanganates, inorganic, n.o.s. (*except Ammonium permanganate, which is forbidden*).	5.1	UN1482	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	56, 69
	Peroxides, inorganic, n.o.s.	5.1	UN1483	II	OXIDIZER	A20, B10, N26, N34.	None	212	240	5 kg	25 kg	1,2	1	13, 46
	Peroxyacetic acid, more than 43 per cent and with more than 6 per cent hydrogen peroxide.	Forbidden												
	Peroxyacetic acid *not more than 43 per cent in acetic acid, or* Peroxyacetic acid *in a mixture of acid and water, with not more than 6 per cent hydrogen peroxide and not more than 1 per cent sulfuric acid.*	5.2	UN2131	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	12, 40
	Peroxyacetic acid, *not more than 16 per cent in a mixture with at least 39 per cent water, at least 15 per cent acetic acid, not more than 24 per cent hydrogen peroxide, with stabilizer.*	5.2	UN3045	I	ORGANIC PEROXIDE, CORROSIVE.		None	225	None	1 kg	5 kg	1	5	12, 40
	Pesticides, liquid, flammable, toxic, n.o.s., *flash point less than 23 degrees C.*	3	UN3021	I	FLAMMABLE LIQUID, POISON.	B5	None	201	243	Forbidden	30 L	1,3	5	

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	
	Pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23 degrees C.*	6.1	UN2903	I	POISON, FLAMMABLE LIQUID.	T42	None	201	243	1 L	30 L	1	1	23, 40, 95
				II	POISON, FLAMMABLE LIQUID.	T14	None	202	243	5 L	60 L	1,2	1	23, 40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	242	60 L	220 L	1,2	1,2	23, 34, 40
	Pesticides, liquid, toxic, n.o.s.	6.1	UN2902	I	POISON	T42	None	201	243	1 L	30 L	1	1	40, 95
				II	POISON	T14	None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Pesticides, solid, toxic, n.o.s.	6.1	UN2588	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	40, 95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34, 40
	PETN, *see* Pentaerythrite tetranitrate													
	PETN/TNT, *see* Pentolite, *etc.*													
	Petrol, *see* Gasoline													
	Petroleum crude oil	3	UN1267	II	FLAMMABLE LIQUID.	T8, T31	150	202	242	5 L	60 L	1,3	5	12
				III	FLAMMABLE LIQUID.	B1, T8, T31.	150	203	242	60 L	220 L	1,3	1,3	12
	Petroleum distillates, n.o.s.	3	UN1268	I	FLAMMABLE LIQUID.	T42	150	201	243	1 L	30 L	1,3	5	12
				II	FLAMMABLE LIQUID.	T7, T30	150	202	242	5 L	60 L	1,3	5	12
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1,3	12
	Petroleum ether, see Petroleum spirit													
	Petroleum gases, liquefied	2.1	UN1075		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	Petroleum naphtha, see Naphtha, *petroleum.*													
	Petroleum oil	3	UN1270	II	FLAMMABLE LIQUID.	T8, T31	150	202	242	5 L	60 L	1,3	5	12
				III	FLAMMABLE LIQUID.	B1, T8, T31.	150	203	242	60 L	220 L	1,3	1,3	12
	Petroleum spirit	3	UN1271	I	FLAMMABLE LIQUID.	T8	150	201	243	5 L	60 L	1,3	5	12
				II	FLAMMABLE LIQUID.	B1, T8	150	202	242	60 L	220 L	1,3	1	12
				III	FLAMMABLE LIQUID.	T8	150	202	241	60 L	220 L	1,2	1,2	
	Phenacyl bromide	6.1	UN2645	II	POISON		None	212	242	25 kg	100 kg	1,3	1	12, 40, 95

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Phenetidines	6.1	UN2311	III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	1,2	34
E	Phenol, molten (*RQ-1000/454*)	6.1	UN2312	II	POISON	B14, T8, T38.	None	202	243	Forbidden	Forbidden	1	1	40, 95
E	Phenol, solid (*RQ-1000/454*)	6.1	UN1671	II	POISON	N78, T14	None	212	240	25 kg	100 kg	1,2	1,2	95
E	Phenol solutions (*RQ-1000/454*)	6.1	UN2821	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	95
	Phenolsulfonic acid, liquid	8	UN1803	II	CORROSIVE	B2, N16, N34, N41, T8.	154	202	242	1 L	30 L	1,2	1	
	Phenoxy pesticides, liquid, flammable, toxic n.o.s., *flash point less than 23 degrees C.*	3	UN2766	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	5	
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	
	Phenoxy pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23 degrees C.*	6.1	UN2999	I	POISON, FLAMMABLE LIQUID.	T42	None	201	243	1 L	30 L	1	1	23, 40, 95
				II	POISON, FLAMMABLE LIQUID.	T14	None	202	243	5 L	60 L	1,2	1	23, 40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	242	60 L	220 L	1,2	1,2	23, 34, 40
	Phenoxy pesticides, liquid, toxic, n.o.s.	6.1	UN3000	I	POISON	T42	None	201	243	1 L	30 L	1	1	40, 95
				II	POISON	T14	None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Phenoxy pesticides, solid, toxic, n.o.s.	6.1	UN2765	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	40, 95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34, 40
	Phenylacetonitrile, liquid	6.1	UN2470	III	KEEP AWAY FROM FOOD.	T8	153	203	241	60 L	220 L	1,2	1,2	26, 34
	Phenylacetyl chloride	8	UN2577	II	CORROSIVE	B2, T8, T26.	154	202	242	1 L	30 L	1	1	40
	Phenylcarbylamine chloride	6.1	UN1672	I	POISON	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1	5	40, 95
	Phenylchloroformate	6.1	UN2746	II	POISON, CORROSIVE.	T12	None	202	243	1 L	30 L	1,3	1,3	12, 13, 23, 25, 40, 95
D	Phenyldichloroarsine	6.1	NA1556	I	POISON	B3, B14, B30, 10.	None	226	244	Forbidden	Forbidden	1	5	
	m-Phenylene diaminediperchlorate (dry)	Forbidden												
	Phenylenediamines (*o-,m-,p-*)	6.1	UN1673	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Phenylhydrazine	6.1	UN2572	II	POISON		None	202	243	5 L	60 L	1,2	1,2	40, 95

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Phenyl isocyanate	6.1	UN2487	I	POISON	B14, B32, N1, N33, N34, 10.	None	227	244	Forbidden	Forbidden	1	1,3	21, 25, 40, 95
	Phenyl mercaptan	6.1	UN2337	I	POISON, FLAMMABLE LIQUID.	B14, B36, 10.	None	227	244	Forbidden	Forbidden	1	1,3	21, 40, 95
	Phenylmercuric acetate	6.1	UN1674	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Phenylmercuric compounds, n.o.s.	6.1	UN2026	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Phenylmercuric hydroxide	6.1	UN1894	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Phenylmercuric nitrate	6.1	UN1895	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Phenyl phosphorus dichloride	8	UN2798	II	CORROSIVE	B2, B15, T8, T26.	154	202	242	Forbidden	30 L	1,2	1	40
	Phenyl phosphorus thiodichloride	8	UN2799	II	CORROSIVE	B2, B15, T8, T26.	154	202	242	Forbidden	30 L	1,2	1	40
	Phenyltrichlorosilane	8	UN1804	I	CORROSIVE, POISON.	B6, B14, B32, N26, N34, 10.	None	227	244	Forbidden	Forbidden	1	1	
	Phenyl urea pesticides, liquid, flammable, toxic, n.o.s., *flash point less than 23 degrees C.*	3	UN2768	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	5	
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	
	Phenyl urea pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23 degrees C.*	6.1	UN3001	I	POISON, FLAMMABLE LIQUID.	T42	None	201	243	1 L	30 L	1	1	23, 40, 95
				II	POISON, FLAMMABLE LIQUID.	T14	None	202	243	5 L	60 L	1,2	1	23, 40, 95
				III	KEEP AWAY FROM FOOD.	B1, T14	153	203	242	60 L	220 L	1,2	1,2	23, 34, 40
	Phenyl urea pesticides, liquid, toxic, n.o.s.	6.1	UN3002	I	POISON	T42	None	201	243	1 L	30 L	1	1	40, 95
				II	POISON	T14	None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Phenyl urea pesticides, solid, toxic, n.o.s.	6.1	UN2767	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	40, 95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34, 40
E	Phosgene (*RQ-5000/2270*)	2.3	UN1076	IA	POISON GAS, CORROSIVE.	B7, 10	None	192	245	Forbidden	Forbidden	1	5	40, 95

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	9-Phosphabicyclononanes (Cyclo-octadiene phosphines).	4.2	UN2940	II	SPONTANEOUSLY COMBUSTIBLE.	A19	None	212	241	15 kg	50 kg	1,3	1,3	
	Phosphine	2.3	UN2199	IA	POISON GAS, FLAMMABLE GAS.	B7, 10	None	192	245	Forbidden	Forbidden	1	5	40, 95
E	Phosphoric acid (*RQ-5000/2270*)	8	UN1805	III	CORROSIVE	N26, N34, T7.	154	203	241	5 L	60 L	1,2	1,2	
	Phosphoric acid triethyleneimine, see Tri-(1-aziridiyl) phosphine oxide, solution.													
	Phosphoric anhydride, see Phosphorus pentoxide.													
	Phosphorous acid, ortho	8	UN2834	III	CORROSIVE	T7	154	213	240	25 kg	100 kg	1,3	1,3	48
E	Phosphorus, amorphous (*RQ-1/0.454*)	4.1	UN1338	III	FLAMMABLE SOLID.	A1, A19, B12, B26.	None	213	243	25 kg	100 kg	1,3	1,3	
	Phosphorus bromide, see Phosphorus tribromide.													
	Phosphorus chloride, see Phosphorus trichloride.													
	Phosphorus heptasulfide, *free from yellow and white phosphorus.*	4.1	UN1339	II	FLAMMABLE SOLID.	A20, B10, N34.	None	212	240	15 kg	50 kg	1,3	1	74
	Phosphorus oxybromide	8	UN1939	II	CORROSIVE	B8, B10, N15, N34, N41.	None	212	240	Forbidden	50 kg	1	1	12, 40
	Phosphorus oxybromide, molten	8	UN2576	II	CORROSIVE	B2, B8, N15, N34, N41, T8, T27, T38.	None	202	242	Forbidden	Forbidden	1	1	40
E	Phosphorus oxychloride (*RQ-5000/2270*)	8	UN1810	I	CORROSIVE, POISON.	B8, B14, B25, B32, N26, N34, 10.	None	227	244	Forbidden	Forbidden	1	1	80, 40
	Phosphorus pentabromide	8	UN2691	II	CORROSIVE	B10, N26, N34.	154	202	240	Forbidden	50 kg	1,3	1	12, 40
	Phosphorus pentachloride	8	UN1806	II	CORROSIVE	B10, N26, N34.	None	202	240	Forbidden	50 kg	1	1	40
	Phosphorus pentafluoride	2.3	UN2198	IA	POISON GAS	B13, 10	None	302	245	Forbidden	Forbidden	1	5	40, 95
E	Phosphorus pentasulfide, *free from yellow and white phosphorus (RQ-100/45.4).*	4.3	UN1340	II	DANGEROUS WHEN WET.	A20, B10, N34.	None	212	241	15 kg	50 kg	1,3	1,3	74
	Phosphorus pentoxide	8	UN1807	II	CORROSIVE	B10, N26, N34.	154	212	240	Forbidden	50 kg	1,2	1,2	9

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Phosphorus sesquisulfide, *free from yellow and white phosphorus.*	4.1	UN1341	II	FLAMMABLE SOLID.	A20, B10, N34.	None	212	240	15 kg	50 kg	1,3	1	74
	Phosphorus tribromide	8	UN1808	II	CORROSIVE	B2, B25, N1, N11, N26, N34, T8.	None	202	242	Forbidden	30 L	1	1	80, 40
E	Phosphorus trichloride (*RQ-5000/2270*)	8	UN1809	I	CORROSIVE, POISON.	B8, B14, B25, B32, N1, N26, N34, 10.	None	227	244	Forbidden	Forbidden	1	1	80, 40
	Phosphorus trioxide	8	UN2578	III	CORROSIVE		154	213	241	25 kg	100 kg	1,3	1,3	12
	Phosphorus trisulfide, *free from yellow and white phosphorus.*	4.1	UN1343	II	FLAMMABLE SOLID.	A20, B10, N34.	None	212	240	15 kg	50 kg	1,3	1	74
	Phosphorus, white *or* yellow dry *or* under water *or* in solution (*RQ-1/0.454*).	4.2	UN1381	I	SPONTANEOUSLY COMBUSTIBLE, POISON.	A19, B12, B26, N1, N15, N34, T15, T26, T33.	None	211	243	Forbidden	Forbidden	1,3	5	
E	Phosphorus white, molten (*RQ-1/0.454*)	4.2	UN2447	I	SPONTANEOUSLY COMBUSTIBLE, POISON.	A19, B12, B26, N1, N15, N34, T15, T26, T29.	None	211	243	Forbidden	Forbidden	1	5	
	Phosphorus (white or red) and a chlorate, mixtures of.	Forbidden												
	Phosphoryl chloride, see Phosphorus oxychloride.													
	Photo-flash powder, *in units*	1.1G	UN0094											
	Photo-flash powder, *in units*	1.2G	UN0096											
	Photo-flash powder, *in units*	1.3G	UN0305											
	Phthalic anhydride	8	UN2214	III	CORROSIVE	T7, T38	154	213	240	25 kg	100 kg	1,2	1,2	34
	Phthalimide derivative pesticides, liquid, flammable, toxic, n.o.s., *flash point less than 23 degrees C.*	3	UN2774	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	5	
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Phthalimide derivative pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23 degrees C.*	6.1	UN3007	I	POISON, FLAMMABLE LIQUID.	T42	None	201	243	1 L	30 L	1	1	23, 40, 95
				II	POISON, FLAMMABLE LIQUID.	T14	None	202	243	5 L	60 L	1,2	1	23, 40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	242	60 L	220 L	1,2	1,2	23, 34, 40
	Phthalimide derivative pesticides, liquid, toxic, n.o.s..	6.1	UN3008	I	POISON	T42	None	201	243	1 L	30 L	1	1	40, 95
				II	POISON	T14	None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Phthalimide derivative pesticides, solid, toxic, n.o.s..	6.1	UN2773	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	40, 95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34, 40
	Picolines	3	UN2313	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1,3	40
	Picric acid, *see* Trinitrophenol, *etc.*													
D	Picric acid, wet, with not less than 10% water.	4.1	NA1344	I	FLAMMABLE SOLID.	A19, A20, N34, N41.	None	211	None	Forbidden	Forbidden	1	5	
	Picrite, *see* Nitroguanidine, *etc.*													
	Picryl chloride, *see* Trinitrochlorobenzene													
	Pinane hydroperoxide, *see* Pinanyl hydroperoxide, *technically pure.*													
	Pinanyl hydroperoxide *or* Pinane hydroperoxide, *technically pure.*	5.2	UN2162	I	ORGANIC PEROXIDE.	B19, T25	None	225	243	1 L	5 L	1	5	12, 40
	Pindone *liquid*	6.1	UN2472	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34
							153	213	240L	100 kg	200 kg	1,2	1,2	
	Pindone *solid*	6.1	UN2472	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	alpha-Pinene	3	UN2368	III	FLAMMABLE LIQUID.	T1	150	203	242	60 L	220 L	1,3	1,3	
	Pine oil	3	UN1272	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Pipe[illegible]	8	UN2579	III	CORROSIVE	T7	154	213	240	25 kg	100 kg	1,3	1,3	12
	Piperidine	3	UN2401	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1,3	
	Pivaloyl chloride, see Trimethyl acetyl chloride.	4.2	UN2006	III	SPONTANEOUSLY COMBUSTIBLE.		None	213	None	Forbidden	Forbidden	1	1	
	Plastics, nitrocellulose based, spontaneously combustible, n.o.s..													
	Plastic solvent, n.o.s., see Flammable liquids, n.o.s..													

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Poisonous gases, n.o.s., see Compressed *or* liquefied gases, flammable *or* toxic, n.o.s..													
	Poisonous liquids, corrosive, n.o.s.	6.1	UN2927	I	POISON, CORROSIVE.	B38, T42	None	201	243	0.5 L	2.5 L	1,2	1	20, 40, 95
				II	POISON, CORROSIVE.		None	202	243	1 L	30 L	1,2	1	20, 40, 95
	Poisonous liquids, flammable, n.o.s.	6.1	UN2929	I	POISON, FLAMMABLE LIQUID.	B38, B40, T42.	None	201	243	1 L	30 L	1,2	1	21, 40, 95
				II	POISON, FLAMMABLE LIQUID.	T15	None	202	243	5 L	60 L	1,2	1	21, 40, 95
	Poisonous liquids, n.o.s.	6.1	UN2810	I	POISON	B38, B40, T42.	None	201	243	1 L	30 L	1,2	1	40, 95
				II	POISON	T14	None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	1	34, 40
	Poisonous solids, corrosive, n.o.s.	6.1	UN2928	I	POISON, CORROSIVE.		None	211	242	1 kg	25 kg	1,2	1	20, 40, 95
				II	POISON, CORROSIVE.		None	212	242	15 kg	50 kg	1,2	1	20, 40, 95
	Poisonous solids, flammable, n.o.s.	6.1	UN2930	I	POISON, FLAMMABLE SOLID.		None	211	242	1 kg	15 kg	1,2	1	24, 40, 95
				II	POISON, FLAMMABLE SOLID.		None	212	242	15 kg	50 kg	1,2	1	24, 40, 95
	Poisonous solids, n.o.s.	6.1	UN2811	I	POISON		None	211	242	5 kg	50 kg	1,2	1	95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1	95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1	34
	Poisonous solids, oxidizing, n.o.s.	6.1	UN3086	I	POISON, OXIDIZER.		None	211	242	1 kg	15 kg	1,2	1	40, 89, 95
				II	POISON, OXIDIZER.		None	212	242	15 kg	50 kg	1,2	1	40, 89, 95
	Polyalkylamines, n.o.s., *see* Alkylamines, *etc.*.													
AEW	Polychlorinated biphenyls (*RQ-10/4.54*)	9	UN2315	II	None	B10	155	202	240	100 L	220 L	1,2	1,2	34
D	Polyester resin kits	5.2	NA2255	II	ORGANIC PEROXIDE.	66	None	225	246	5 kg	5 kg	1	5	
	Polystyrene beads, expandable, *impregnated with flammable liquid.*	9	UN2211	III	None		221	221	240	100 kg	200 kg	1,2	1,2	64
	Potassium	4.3	UN2257	II	DANGEROUS WHEN WET.	A19, A20, B27, N6, N34, T15, T26.	None	212	244	Forbidden	50 kg	1	5	
E	Potassium arsenate (*RQ-1000/454*)	6.1	UN1677	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
E	Potassium arsenite (*RQ-10/4.54*)	6.1	UN1678	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Potassium bifluoride	8	UN1811	II	CORROSIVE, POISON.	N3, N34, T8.	154	212	242	15 kg	50 kg	1,3	1,3	25, 26, 40
	Potassium bifluoride solution, see Corrosive liquid, n.o.s..													
	Potassium bisulfite solution, *see* Bisulfites, inoganic, aqueous solutions, n.o.s..													
	Potassium borohydride	4.3	UN1870	I	DANGEROUS WHEN WET.	A19	None	211	242	Forbidden	15 kg	1,3	5	
	Potassium bromate	5.1	UN1484	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
	Potassium carbonyl	Forbidden												
	Potassium chlorate	5.1	UN1485	II	OXIDIZER	B10, N13, N34.	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
	Potassium chlorate mixed with mineral oil, see Explosive, blasting, type C.													
	Potassium chlorate, solution	5.1	UN2427	II	OXIDIZER	A2, T8	152	202	241	1 L	5 L	1,2	1	46, 56
DE	Potassium chromate (*RQ-1000/454*)	ORM-E	NA9142	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Potassium cuprocyanide	6.1	UN1679	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	26, 95
E	Potassium cyanide (*RQ-10/4.54*)	6.1	UN1680	I	POISON	N74, N75, T8, T26.	None	211	242	5 kg	50 kg	1,2	1,2	26, 95
	Potassium dichloro isocyanurate, See Oxidizer, n.o.s..													
DE	Potassium dichromate (*RQ-1000/454*)	ORM-E	NA9143	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Potassium dithionite *or* Potassium hydrosulfite.	4.2	UN1929	II	SPONTANEOUSLY COMBUSTIBLE.	A19, A20, N2.	None	212	241	15 kg	50 kg	1,3	5	13
	Potassium fluoride	6.1	UN1812	III	KEEP AWAY FROM FOOD.	T8	153	213	240	100 kg	200 kg	1,2	1,2	26, 34
	Potassium fluoroacetate	6.1	UN2628	I	POISON		None	211	242	5 kg	50 kg	1,2	5	95
	Potassium fluorosilicate	6.1	UN2655	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	26, 34
	Potassium hydrate, see Potassium hydroxide, solid.													
	Potassium hydrogen fluoride, see Potassium bifluoride.													
	Potassium hydrogen fluoride solution, see Corrosive liquid, n.o.s..													
	Potassium hydrogen sulfate	8	UN2509	II	CORROSIVE	N26, N34	154	212	240	15 kg	50 kg	1,2	1,2	27
	Potassium hydrosulfite, *see* Potassium dithionite.													
	Potassium hydroxide, liquid, see Potassium hydroxide solution.													
E	Potassium hydroxide, solid (*RQ-1000/454*)	8	UN1813	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	
E	Potassium hydroxide, solution (*RQ-1000/454*).	8	UN1814	II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1,2	1,2	
	Potassium hypochlorite, solution, see Hypochlorite solutions, *etc.*.													

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Potassium, metal alloys	4.3	UN1420	II	DANGEROUS WHEN WET.	A19, A20, B27, N16.	None	212	244	Forbidden	50 kg	1	5	
	Potassium metal, liquid alloy, see Alkali metal alloys, liquid.													
	Potassium metavanadate	6.1	UN2864	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Potassium monoxide	8	UN2033	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	
	Potassium nitrate	5.1	UN1486	III	OXIDIZER	A1, A29	152	212	240	25 kg	100 kg	1,2	1,2	
E	Potassium nitrate and sodium nitrite mixtures (*RQ-100/45.4*).	5.1	UN1487	II	OXIDIZER	B10, B12	152	212	240	5 kg	25 kg	1,2	1,2	34, 56, 58
	Potassium nitrite	5.1	UN1488	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	34, 56, 58
	Potassium perchlorate	5.1	UN1489	II	OXIDIZER	B10, T8	152	212	240	5 kg	25 kg	1,2	1,2	46
E	Potassium permanganate (*RQ-100/45.4*)	5.1	UN1490	II	OXIDIZER	B10, B12	152	212	240	5 kg	25 kg	1,2	1,2	56, 69
	Potassium peroxide	5.1	UN1491	I	OXIDIZER	A20, N16, N34.	None	211	None	Forbidden	15 kg	1,2	1,2	13
	Potassium persulfate	5.1	UN1492	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,2	1,2	
	Potassium phosphide	4.3	UN2012	I	DANGEROUS WHEN WET, POISON.	A19	None	211	None	Forbidden	15 kg	1,2	5	40, 85
	Potassium salts of aromatic nitro-derivatives, *explosive-*.	1.3C	UN0158											
	Potassium selenate, *see* Selenates *or* Selenites.													
	Potassium selenite, *see* Selenates *or* Selenites.													
E	Potassium sodium alloys (*RQ-1000/454*)	4.3	UN1422	I	DANGEROUS WHEN WET.	A19, B27, N34, T15, T26.	None	211	244	Forbidden	15 kg	1	5	
	Potassium sulfide, anhydrous *or* Potassium sulfide *with less than 30 per cent water of crystallization.*	4.2	UN1382	II	SPONTANEOUSLY COMBUSTIBLE.	A19, A20, B16, N34.	None	212	241	15 kg	50 kg	1,3	1,3	52
	Potassium sulfide, hydrated *with not less than 30 per cent water of crystallization.*	8	UN1847	II	CORROSIVE	B10	154	212	240	15 kg	50 kg	1,2	1,2	26
	Potassium superoxide	5.1	UN2466	I	OXIDIZER	A20	None	211	None	Forbidden	15 kg	1,2	1	13, 31
	Powder cake (Powder paste) wetted *with not less than 35 per cent water, by weight.*	1.3C	UN0159											
	Powder cake, wetted *with not less than 17 per cent alcohol by weight.*	1.1C	UN0433											
	Powder paste, *see* Powder cake, *etc.*													
	Powder, smokeless	1.1C	UN0160											
	Powder, smokeless	1.3C	UN0161											
	Power device, explosive, see Cartridges, power device.													
	Primers, cap type	1.4S	UN0044											
	Primers, cap type	1.1B	UN0377											
	Primers, cap type	1.4B	UN0378											

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Primers, small arms, see Primers, cap type													
	Primers, tubular	1.3G	UN0319											
	Primers, tubular	1.4G	UN0320											
	Primers, tubular	1.4S	UN0376											
	Projectiles, illuminating, see Ammunition, illuminating, *etc.*													
	Projectiles, *inert with tracer*	1.45	UN0345											
	Projectiles, *inert, with tracer*	1.3G	UN0424											
	Projectiles, *inert, with tracer*	1.4G	UN0425											
	Projectiles, *with burster or expelling charge*	1.2D	UN0346											
	Projectiles, *with burster or expelling charge*	1.4D	UN0347											
	Projectiles, *with burster or expelling charge*	1.2F	UN0426											
	Projectiles, *with burster or expelling charge*	1.4F	UN0427											
	Projectiles, *with burster or expelling charge*	1.2G	UN0434											
	Projectiles, *with burster or expelling charge*	1.4G	UN0435											
	Projectiles, *with bursting charge*	1.1F	UN0167											
	Projectiles, *with bursting charge*	1.1D	UN0168											
	Projectiles, *with bursting charge*	1.2D	UN0169											
	Projectiles, *with bursting charge*	1.2F	UN0324											
	Projectiles, *with bursting charge*	1.4D	UN0344											
	Propadiene	2.1	UN2200		FLAMMABLE GAS.	B13	None	304	244	Forbidden	150 kg	1	5	40
	Propadiene mixed with methyl acetylene, see Methyl acetylene and propadiene mixtures, stabilized.													
	Propane *see also* Petroleum gases, liquified.	2.1	UN1978		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	Propanethiols	3	UN2402	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	5	12, 13, 34, 35, 40
	Propanol *or* Propyl alcohol	3	UN1274	II	FLAMMABLE LIQUID.	B1, T1	150	202	242	5 L	60 L	1,3	1	
DE	Propargite (*RQ-10/4.54*)	ORM-E	NA2765	III	None		156	213	240	No limit	No limit	1,2	1,2	
D	Propargyl alcohol	3	NA1986	II	FLAMMABLE LIQUID, POISON.		None	202	243	Forbidden	1 L	1,3	1	
	Propionaldehyde	3	UN1275	II	FLAMMABLE LIQUID.	T14	150	202	242	5 L	60 L	1,3	1	12
E	Propionic acid (*RQ-5000/2270*)	8	UN1848	III	CORROSIVE	T7	154	203	241	5 L	60 L	1,3	1,3	22, 76, 77
E	Propionic anhydride (*RQ-5000/2270*)	8	UN2496	III	CORROSIVE	T2	154	203	241	5 L	60 L	1,2	1,2	8
	Propionitrile	3	UN2404	I	FLAMMABLE LIQUID, POISON.	B14	None	201	243	1 L	60 L	1,3	5	12, 40, 94
	Propionyl chloride	3	UN1815	II	FLAMMABLE LIQUID, CORROSIVE.	T8, T26	None	202	243	1 L	5 L	1,3	1	40
	Propionyl peroxide, *see* Dipropionyl peroxide, *etc.*													

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(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	n-Propyl acetate	3	UN1276	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Propyl alcohol, *see* Propanol													
	Propylamine	3	UN1277	II	FLAMMABLE LIQUID.	N34, T14	None	202	242	Forbidden	60 L	1,3	5	12, 40
	Propyl benzene	3	UN2364	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Propyl chloride	3	UN1278	II	FLAMMABLE LIQUID.	N34, T14	None	202	242	Forbidden	60 L	1,3	5	12
	n-Propyl chloroformate	3	UN2740	I	FLAMMABLE LIQUID, POISON, CORROSIVE.	B6, B14, B32, N1, N11, N26, N34, 10.	None	227	244	Forbidden	Forbidden	1,3	5	21, 40, 95
	Propylene chlorohydrin	6.1	UN2611	II	POISON	T9	None	202	243	5 L	60 L	1,3	1,3	12, 21, 25, 40, 95
	1,2-Propylenediamine	8	UN2258	II	CORROSIVE, FLAMMABLE LIQUID.	N1, N11, N34, T8.	None	202	243	1 L	30 L	1,3	1,3	40
E	Propylene dichloride (*RQ-5000/2270*)	3	UN1279	II	FLAMMABLE LIQUID.	N36, T1	150	202	242	5 L	60 L	1,3	1	
	Propyleneimine, inhibited	3	UN1921	I	FLAMMABLE LIQUID.	N1, N15, N34, T25.	None	201	243	Forbidden	30 L	1,3	5	40
E	Propylene oxide (*RQ-5000/2270*)	3	UN1280	I	FLAMMABLE LIQUID.	N1, N15, N34, T20, T29.	None	201	243	Forbidden	30 L	1,3	5	12
	Propylene *see also* Petroleum gases, liquified.	2.1	UN1077		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	Propylene tetramer	3	UN2850	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Propyl formates	3	UN1281	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	n-Propyl isocyanate	3	UN2482	I	FLAMMABLE LIQUID, POISON.	N15, N26, T18, T26.	None	201	243	Forbidden	30 L	1	5	12, 40, 48
	Propyl mercaptan, see Propanethiols													
	n-Propyl nitrate	3	UN1865	II	FLAMMABLE LIQUID.	T25	150	202	None	5 L	60 L	1,3	1	
	Propyltrichlorosilane	8	UN1816	I	CORROSIVE, FLAMMABLE LIQUID.	B1, B6, N16, N26, N34, T8, T26.	None	201	243	Forbidden	Forbidden	1	1	21, 40

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
				II	CORROSIVE	B2, B6, N16, N26, N34, T8, T26.	None	202	242	Forbidden	30 L	1	1	13, 21, 78
	Prussic acid, see Hydrogen cyanide													
DE	Pyrethrins (*RQ-1000/454*)	ORM-E	NA9184	III	None		156	203	241	No limit	No limit	1,2	1,2	
	Pyridine	3	UN1282	II	FLAMMABLE LIQUID, POISON.	T8	None	202	243	1 L	60 L	1,3	1	40
	Pyridine perchlorate	Forbidden												
	Pyrophoric *or* Pyroforic liquids, n.o.s.	4.2	UN2845	I	SPONTANEOUSLY COMBUSTIBLE.	B11	None	181	244	Forbidden	Forbidden	1	5	18
	Pyrophoric *or* Pyroforic solids, n.o.s.	4.2	UN2846	I	SPONTANEOUSLY COMBUSTIBLE.		None	187	242	Forbidden	Forbidden	1	1	
				II	SPONTANEOUSLY COMBUSTIBLE.		None	187	241	Forbidden	Forbidde	1	1	
				III	SPONTANEOUSLY COMBUSTIBLE.		None	187	241	Forbidden	Forbidden	1	1	
	Pyrophoric metals, *solid*, n.o.s. *or* Pyrophoric alloys, *solid*, n.o.s.	4.2	UN1383	I	SPONTANEOUSLY COMBUSTIBLE.	B11	None	187	242	Forbidden	Forbidden	1	5	
	Pyrosulfuryl chloride	8	UN1817	II	CORROSIVE	B2, T9, T27.	154	202	242	1 L	30 L	1	1	80, 40
	Pyroxylin solution or solvent, see Nitrocellulose.													
	Pyrrolidine	3	UN1922	II	FLAMMABLE LIQUID.	T1	150	202	242	Forbidden	60 L	1,3	1	40
	Quebrachitol pentanitrate	Forbidden												
	Quicklime, see Calcium oxide													
E	Quinoline (*RQ-1000/454*)	6.1	UN2656	III	KEEP AWAY FROM FOOD.	T8	153	203	241	60 L	220 L	1,3	1,3	12, 22, 25, 34
	R 12, see Dichlorodifluoromethane													
	R 12B1, see Chlorodifluorobromomethane													
	R 13, see Chlorotrifluoromethane													
	R 13B1, see Bromotrifluoromethane													
	R 14, see Tetrafluoromethane													
	R 21, see Dichlorofluoromethane													
	R 22, see Chlorodifluoromethane													

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification Numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	R 114, see Dichlorotetrafluoroethane													
	R 115, see Chloropentafluoroethane													
	R 116, see Hexafluoroethane													
	R 124, see Chlorotetrafluoroethane													
	R 133a, see Chlorotrifluoroethane													
	R 152a, see Difluoroethane													
	R 500, see Dichlorodifluoromethane and difluorethane, *etc.*.													
	R 502, see Chlorodifluoromethane and chloropentafluoroethane mixture, *etc.*.													
	R 503, see Chlorotrifluoromethane and trifluoromethane, *etc.*.													
	Radioactive material, excepted package-articles manufactured from natural *or* depleted uranium *or* natural thorium.	7	UN2910		None		421-1, 424	421-1, 424	None			1,2	1,2	
	Radioactive material, excepted package-empty packaging.	7	UN2910		EMPTY		427	427	427			1,2	1,2	
	Radioactive material, excepted package-instruments or articles.	7	UN2910		None		421-1, 422	421-1, 422	None					
	Radioactive material, excepted package-limited quantity of material.	7	UN2910		None		421, 421-1	421, 421-1	None			1,2	1,2	
	Radioactive material, fissile, n.o.s., *Class I, II, or III.*	7	UN2918		RADIOACTIVE		453	417	None			1,2	1,2	
	Radioactive material, low specific activity *LSA*, n.o.s..	7	UN2912		RADIOACTIVE		421, 422, 424	425	425			1,2	1,2	
	Radioactive material, n.o.s.	7	UN2982		RADIOACTIVE		421, 422, 424	415, 416	None			1,2	1,2	
	Radioactive material, special form, n.o.s.	7	UN2974		RADIOACTIVE		421, 422	415, 416	None			1,2	1,2	
I	Rags, oily	4.2	UN1856	III	SPONTANEOUSLY COMBUSTIBLE.		None	213	None	Forbidden	Forbidden	1,3	1,3	13
	Railway torpedo, see Signals, railway track, explosive.													
	Rare gases and nitrogen mixtures	2.2	UN1981		NONFLAMMABLE GAS.	B13	306	302	244	75 kg	150 kg	1,3	1,3	85
	Rare gases and oxygen mixtures	2.2	UN1980		NONFLAMMABLE GAS.	B13	306	302	244	75 kg	150 kg	1,3	1,3	85
	Rare gases, mixtures (*e.g. Argon; Helium; Krypton; Neon; Xenon*).	2.2	UN1979		NONFLAMMABLE GAS.	B13	306	302	244	75 kg	150 kg	1,3	1,3	85
	RC 318, see Octafluorocyclobutane													
	RDX, see Cyclotrimethylene trinitramine, etc..													

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Receptacles, small with flammable compressed gas *without a dispersion device, not refillable.*	2.1	UN2037		FLAMMABLE GAS.		306	304	None	1 kg	15 kg	1	1	40
	Red phosphorus, see Phosphorus, amorphous.													
	Refrigerant gases, n.o.s. (*e.g. non-flammable halocarbons*).	2.2	UN1078		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
D	Refrigerant gas, n.o.s. *or* Dispersant gas, n.o.s..	2.1	NA1954		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1	1	40
D	Refrigerating machine	3	NA1993	III	FLAMMABLE LIQUID.		174	174	None	10 L	10 L	1,3	1	
	Refrigerating machines, *containing flammable, non-poisonous, liquefied gas.*	2.1	NA1954		FLAMMABLE GAS.		306	306	306	Forbidden	Forbidden	1	1	40
	Refrigerating machines, *containing nonflammable, non-poisonous, liquefied gas.*	2.2	UN2857		NONFLAMMABLE GAS.		306, 307	306	306, 307	Forbidden	Forbidden	1,3	1,3	85
	Release devices, explosive	1.4S	UN0173											
	Resin oil *or* Rosin oil	3	UN1286	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,2	1,2	
	Resin solution, *flammable*	3	UN1866	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1,3	
				III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
I	Resin solution, poisonous	6.1	UN1866	I	POISON		None	201	243	1 L	30 L	1,2	1,2	23, 95
				II	POISON		None	202	243	5 L	60 L	1,2	1,2	23, 95
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	23, 34
E	Resorcinol (*RQ-1000/454*)	6.1	UN2876	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Rifle grenade, see Grenades, *hand or rifle, etc.*.													
	Rifle powder, see Powder, smokeless (*UN 0160*).													
	Rivets, explosive	1.4S	UN0174											
	Road asphalt or tar liquid, see Tars, liquid, *etc.*.													
	Rocket motors	1.3C	UN0186											
	Rocket motors	1.1C	UN0280											
	Rocket motors	1.2C	UN0281											
	Rocket motors, liquid fueled	1.2J	UN0395											
	Rocket motors, liquid fueled	1.3J	UN0396											
	Rocket motors *with hypergolic liquids, with or without an expelling charge.*	1.3L	UN0250											
	Rocket motors *with hypergolic liquids, with or without an expelling charge.*	1.2L	UN0322											
	Rockets, line-throwing	1.2G	UN0238											
	Rockets, line-throwing	1.3G	UN0240											
	Rockets, liquid fueled *with bursting charge*	1.2J	UN0398											
	Rockets, liquid-fueled *with bursting charge*	1.1J	UN0397											

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***) Exceptions	Non-bulk packaging	Bulk packaging	(9) Quantity limitations Passenger aircraft or railcar	Cargo aircraft only	(10) Vessel stowage requirements Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Rockets, *with bursting charge*	1.1F	UN0180											
	Rockets, *with bursting charge*	1.1E	UN0181											
	Rockets, *with bursting charge*	1.2E	UN0182											
	Rockets, *with bursting charge*	1.2F	UN0295											
	Rockets, *with expelling charge*	1.2C	UN0436											
	Rockets, *with expelling charge*	1.3C	UN0437											
	Rockets, *with expelling charge*	1.4C	UN0438											
	Rockets, *with inert head*	1.3C	UN0183											
	Rodenticides, n.o.s.(*liquid*)	6.1	UN1681	I	POISON		None	201	243	1 L	30 L	1	1	40, 95
				II	POISON		None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34, 40
	Rodenticides, n.o.s. (*solid*)	6.1	UN1681	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	40, 95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34, 40
I	Rubber scrap *or* Rubber shoddy, *powdered or granulated.*	4.1	UN1345	II	FLAMMABLE SOLID.		151	212	240	15 kg	50 kg	1,3	1,3	
	Rubber solution	3	UN1287	II	FLAMMABLE LIQUID.	T7, T30	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1,3	
	Rubidium	4.3	UN1423	I	DANGEROUS WHEN WET.	A19, N26, N34, N45, 22.	None	211	242	Forbidden	15 kg	1	5	
	Rubidium hydroxide	8	UN2678	II	CORROSIVE	T8	154	212	240	15 kg	50 kg	1,2	1,2	
	Rubidium hydroxide solution	8	UN2677	II	CORROSIVE	B2	154	202	242	1 L	30 L	1,2	1,2	
	Safety fuse, see Fuse, safety													
	Safety squibs, see Squibs, *etc.*													
	Samples, explosive, *other than initiating explosives.*		UN0190											
	Sand acid, see Fluorosilicic acid													
I	Seed cake *with more than 1.5 per cent oil and not more than 11 per cent moisture.*	4.2	UN1386	III	None		None	213	241	Forbidden	Forbidden	1,3	5	
I	Seed cake *with not more than 1.5 per cent oil and not more than 11 per cent moisture.*	4.2	UN2217	III	None		None	213	241	Forbidden	Forbidden	1,3	1,3	
	Selenates *or* Selenites	6.1	UN2630	I	POISON		None	211	242	5 kg	50 kg	1,2	5	95
	Selenic acid	8	UN1905	I	CORROSIVE	N34	None	211	240	Forbidden	25 kg	1,2	1,2	
	Selenites, *see* Selenates *or* Selenites													
	Selenium disulfide	6.1	UN2657	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Selenium hexafluoride	2.3	UN2194	IA	POISON GAS	10	None	302	245	Forbidden	Forbidden	1	5	40, 95
	Selenium nitride	Forbidden												
DE	Selenium oxide (*RQ-1000/454*)	6.1	NA2811	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Selenium oxychloride	8	UN2879	I	CORROSIVE, POISON.	N1, N11, N26, N34, T12, T27	None	201	243	0.5 L	2.5 L	1,2	5	40
	Selenium powder	6.1	UN2658	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Self-heating substances, solid, n.o.s.	4.2	UN3088	II	SPONTANEOUSLY COMBUSTIBLE.		None	212	241	Forbidden	Forbidden	1	5	
				III	SPONTANEOUSLY COMBUSTIBLE.		None	213	241	Forbidden	Forbidden	1	5	
	Self-propelled vehicle, see Vehicles, self-propelled.													
	Self-reactive substances (*aliphatic azo-compounds, aromatic sulphoh ydrazides, N-nitroso compounds, diazonium salts*) Sample, n.o.s..	4.1	UN3031	I	FLAMMABLE SOLID.		None	214	None	Forbidden	Forbidden	1	5	
	Self-reactive substances (*aliphatic azo-compounds, aromatic sulphohydrazides, n-nitroso compounds, diazonium salts*), Trial quantities, n.o.s..	4.1	UN3032	I	FLAMMABLE SOLID.		None	214	None	Forbidden	Forbidden	1	5	
	Shale oil	3	UN1288	II	FLAMMABLE LIQUID.	T7, T30	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,2	1,2	
	Shaped charges, commercial, see Charges, shaped, commercial.													
	Shaped charges (commercial) containing more than 8 ounces of explosives.	Forbidden												
	Signal devices, hand	1.4G	UN0191											
	Signal devices, hand	1.4S	UN0373											
	Signals, highway, see Signal devices, hand; Fireworks, type D.													
	Signals, railway track, explosive	1.1G	UN0192											
	Signals, railway track, explosive	1.4S	UN0193											
	Signals, ship distress (*other than water-activated contrivances*).	1.1G	UN0194											
	Signals, ship distress (*other than water-activated contrivances*).	1.3G	UN0195											
	Signals, ship distress, wateractivated, see Contrivances, water-activated, *etc.*.													
	Signals, smoke *with explosive sound unit*	1.1G	UN0196											
	Signals, smoke *with explosive sound unit*	1.2G	UN0313											
	Signals, smoke *without explosive sound unit.*	1.4G	UN0197											

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Silane	2.1	UN2203		FLAMMABLE GAS.	B13	None	302	244	Forbidden	Forbidden	1	5	25, 40, 74
	Silicofluoric acid, see Fluorosilicic acid													
	Silicon chloride, see Silicon tetrachloride													
	Silicon powder, amorphous	4.1	UN1346	III	FLAMMABLE SOLID.	A1	None	213	240	25 kg	100 kg	1,3	1,3	
	Silicon tetrachloride	8	UN1818	II	CORROSIVE	B2, B6, N1, N11, N34, N41, T18, T26, T29.	154	202	242	1 L	30 L	1	1	80, 40
	Silicon tetrafluoride	2.3	UN1859	III	POISON GAS, CORROSIVE.	B13, B14, B34, 10.	None	302	244	Forbidden	Forbidden	1	5	40, 95
	Silver acetylide (dry)	Forbidden												
	Silver arsenite	6.1	UN1683	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Silver azide (dry)	Forbidden												
	Silver chlorite (dry)	Forbidden												
	Silver cyanide	6.1	UN1684	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	26, 40, 95
	Silver fulminate (dry)	Forbidden												
E	Silver nitrate (*RQ-1/0.454*)	5.1	UN1493	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	34
	Silver oxalate (dry)	Forbidden												
	Silver picrate (dry)	Forbidden												
	Silver picrate, wetted *with not less than 30 per cent water, by weight.*	4.1	UN1347	I	FLAMMABLE SOLID.		None	211	None	Forbidden	Forbidden	1	5	
	Sludge, acid	8	UN1906	II	CORROSIVE	B2, N1, N26, N34, T9, T14, T27.	None	202	242	Forbidden	30 L	1,2	1	14, 33
D	Small arms ammunition	ORM-D	None	III	None		None	230	None	65 lb gross	65 lb gross	1,2	1,2	
D	Smokeless powder for small arms (*100 pounds or less*).	4.1	NA1325	I	FLAMMABLE SOLID.		None	171	None	Forbidden	Forbidden			
	Soda lime *with more than 4 per cent sodium hydroxide.*	8	UN1907	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
E	Sodium (*RQ-1000/454*)	4.3	UN1428	II	DANGEROUS WHEN WET.	A19, A20, B22, N2, N16, N26, N34, T15, T29.	None	212	243	Forbidden	50 kg	1	5	
AW	Sodium aluminate, solid	8	UN2812	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
	Sodium aluminate, solution	8	UN1819	II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1,2	1,2	
	Sodium aluminum hydride	4.3	UN2835	II	DANGEROUS WHEN WET.	A19, A20, N2.	None	212	242	Forbidden	50 kg	1	5	
	Sodium ammonium vanadate	6.1	UN2863	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
	Sodium arsanilate	6.1	UN2473	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
E	Sodium arsenate (*RQ-1000/454*)	6.1	UN1685	II	POISON		None	212	240	25 kg	100 kg	1,2	1,2	95
E	Sodium arsenite, aqueous solutions (*RQ-1000/454*).	6.1	UN1686	II	POISON	T15	None	202	243	5 L	60 L	1,2	1,2	95
				III	KEEP AWAY FROM FOOD.	T15	153	203	241	60 L	220 L	1,2	1,2	34
	Sodium arsenite, solid	6.1	UN2027	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Sodium azide	6.1	UN1687	II	POISON	B28	None	212	242	25 kg	100 kg	1,2	1,2	36, 52, 95
	Sodium bifluoride, see Sodium hydrogen fluoride.													
	Sodium bisulfate, solid or *solution, see* Sodium hydrogen sulfate, solid *or* solution.													
	Sodium bisulfite, solid or *solution, see* Sodium hydrogen sulfite, solid *or* solution.													
	Sodium borohydride	4.3	UN1426	I	DANGEROUS WHEN WET.		None	211	242	Forbidden	15 kg	1,3	5	
	Sodium bromate	5.1	UN1494	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
	Sodium cacodylate	6.1	UN1688	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	26, 95
	Sodium chlorate	5.1	UN1495	II	OXIDIZER	B10, N13, N34, T8.	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
	Sodium chlorate mixed with dinitrotoluene, see Explosive blasting, type C.													
	Sodium chlorate, solution	5.1	UN2428	II	OXIDIZER	A2, B6, T8.	152	202	241	1 L	5 L	1,2	1	46, 56
	Sodium chlorite	5.1	UN1496	II	OXIDIZER	B10, N13, N34, T8.	None	212	240	5 kg	25 kg	1,2	1,2	46, 56
	Sodium chlorite solution *with more than 5 per cent available chlorine.*	8	UN1908	II	CORROSIVE	B2, N1, N11, N25, N26, N34.	154	202	242	1 L	30 L	1,2	1	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Sodium chloroacetate	6.1	UN2659	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,3	1,3	12, 13, 34
DE	Sodium chromate (*RQ-1000/454*)	ORM-E	NA9145	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Sodium cuprocyanide, solid	6.1	UN2316	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	26, 40, 95
	Sodium cuprocyanide, solution	6.1	UN2317	I	POISON	T8, T26	None	201	243	1 L	30 L	1,2	1	40, 52, 95
E	Sodium cyanide (*RQ-10/4.54*)	6.1	UN1689	I	POISON	N74, N75, T18, T26.	None	211	242	5 kg	50 kg	1,2	1,2	26, 95
	Sodium 2-diazo-1-naphthol-4-sulphonate	4.1	UN3040	II	FLAMMABLE SOLID.		None	214	None	Forbidden	Forbidden	1	5	25
	Sodium 2-diazo-1-naphthol-5-sulphonate	4.1	UN3041	II	FLAMMABLE SOLID.		None	214	None	Forbidden	Forbidden	1	5	25
	Sodium dichloroisocyanurate or *Sodium dichloro-s-triazinetrione, see* Dichloroisocyanuric acid *etc.*.													
DE	Sodium dichromate (*RQ-1000/454*)	ORM-E	NA9144	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Sodium dinitro-o-cresolate, *dry or wetted with less than 15 per cent water, by weight.*	1.3C	UN0234											
	Sodium dinitro-o-cresolate, wetted *with not less than 15 per cent water, by weight.*	4.1	UN1348	I	FLAMMABLE SOLID, POISON.	A19, A20, N2, N34, N41.	None	211	None	1 kg	15 kg	1	5	36
	Sodium dithionite *or* Sodium hydrosulfite	4.2	UN1384	II	SPONTANEOUSLY COMBUSTIBLE.	A19, A20	None	212	241	15 kg	50 kg	1,3	1,3	13
DE	Sodium dodecylbenzenesulfonate (*RQ-1000/454*).	ORM-E	NA9146	III	None		156	213	240	No limit	No limit	1,2	1,2	
E	Sodium fluoride (*RQ-5000/2270*)	6.1	UN1690	III	KEEP AWAY FROM FOOD.	T8	153	213	240	100 kg	200 kg	1,2	1,2	26, 34
	Sodium Fluoride (*RQ-5000/2270*)	6.1	UN1690	III	KEEP AWAY FROM FOOD.	T8	153	213	241	60 L	220 L	1,2	1,2	26
	Sodium fluoroacetate	6.1	UN2629	I	POISON		None	211	242	5 kg	50 kg	1,2	5	40, 95
	Sodium fluorosilicate	6.1	UN2674	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	26, 34
	Sodium hydrate, see Sodium hydroxide													
	Sodium hydride	4.3	UN1427	I	DANGEROUS WHEN WET.	A19	None	211	242	Forbidden	15 kg	1	5	
E	Sodium hydrogen fluoride (*RQ-5000/2270*)	8	UN2439	II	CORROSIVE	N3, N34	154	212	240	15 kg	50 kg	1,3	1,3	12, 25, 26, 40
AW	Sodium hydrogen sulfate, solid	8	UN1821	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
	Sodium hydrogen sulfate, solution	8	UN2837	II	CORROSIVE	B2, N26, N34, T8, T26.	154	202	242	1 L	30 L	1,2	1,2	
ADEW	Sodium hydrogen sulfite, solid (*RQ-5000/2270*).	8	NA2693	III	CORROSIVE		154	213	240	5 kg	50 kg	1,2	1,2	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
ADEW	Sodium hydrogen sulfite, solution (*RQ-5000/2270*).	8	NA2693	III	CORROSIVE		154	203	241	5 L	60 L	1,2	1,2	
DE	Sodium hydrosulfide, solution (*RQ-5000/2270*).	8	NA2922	II	CORROSIVE	B2	154	202	242	1 L	30 L	1,2	1,2	
E	Sodium hydrosulfide, *with less than 25 per cent water of crystallization* (*RQ-5000/2270*).	4.2	UN2318	II	SPONTANEOUSLY COMBUSTIBLE.	A19, A20, N26.	None	212	241	15 kg	50 kg	1,3	1,3	
E	Sodium hydrosulfide *with not less than 25 per cent water of crystallization* (*RQ-5000/2270*).	8	UN2949	II	CORROSIVE	N26	154	212	240	15 kg	50 kg	1,2	1,2	26
	Sodium hydrosulfite, *see* Sodium dithionite													
E	Sodium hydroxide, solid (*RQ-1000/454*)	8	UN1823	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	
E	Sodium hydroxide solution (*RQ-1000/454*)	8	UN1824	II	CORROSIVE	B2, N34, T8.	154	202	242	1 L	30 L	1,2	1,2	
	Sodium hypochlorite, solution, see Hypochlorite solutions.													
	Sodium metal, liquid alloy, see Alkali metal alloys, liquid.													
E	Sodium methylate (*RQ-1000/454*)	4.2	UN1431	II	SPONTANEOUSLY COMBUSTIBLE, CORROSIVE.	A19	None	211	242	Forbidden	15 kg	1,3	1	
E	Sodium methylate solutions *in alcohol* (*RQ-1000/454*).	3	UN1289	II	FLAMMABLE LIQUID.	T8, T31	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	202	242	60 L	220 L	1,3	1,3	
	Sodium monoxide	8	UN1825	II	CORROSIVE		154	212	240	15 kg	50 kg	1,2	1,2	
	Sodium nitrate	5.1	UN1498	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,2	1,2	
	Sodium nitrate and potassium nitrate mixtures.	5.1	UN1499	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,2	1,2	
E	Sodium nitrite (*RQ-100/45.4*)	5.1	UN1500	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,2	1,2	34, 56, 58
	Sodium pentachlorophenate	6.1	UN2567	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
	Sodium percarbonates	5.1	UN2467	III	OXIDIZER	A1, A29, 27.	152	213	240	25 kg	100 kg	1,2	1,2	19
	Sodium perchlorate	5.1	UN1502	II	OXIDIZER	B10, T8	152	212	240	5 kg	25 kg	1,2	1,2	46
	Sodium permanganate	5.1	UN1503	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	56, 69
	Sodium peroxide	5.1	UN1504	I	OXIDIZER	A20, N16, N34.	None	211	None	Forbidden	15 kg	1,2	1	13, 31, 45, 46
	Sodium persulfate	5.1	UN1505	III	OXIDIZER	A1	152	213	240	25 kg	100 kg	1,2	1,2	
	Sodium phenolate, solid	8	UN2497	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
DE	Sodium phosphate, dibasic (*RQ-5000/2270*).	ORM-E	NA9147	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Sodium phosphate, tribasic (*RQ-5000/2270*).	ORM-E	NA9148	III	None		156	213	240	No limit	No limit	1,2	1,2	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***) Exceptions	(8) Non-bulk packaging	(8) Bulk packaging	(9) Quantity limitations Passenger aircraft or railcar	(9) Cargo aircraft only	(10) Vessel stowage requirements Cargo vessel	(10) Passenger vessel	(10) Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Sodium phosphide	4.3	UN1432	I	DANGEROUS WHEN WET, SPONTANEOUSLY COMBUSTIBLE, POISON.	A19	None	211	None	Forbidden	15 kg	1,3	5	40, 85
	Sodium picramate, *dry or wetted with less than 20 per cent water, by weight.*	1.3C	UN0235											
	Sodium picramate, wetted *with not less than 20 per cent water, by weight.*	4.1	UN1349	I	FLAMMABLE SOLID.	A19, N2, N34, N41.	None	211	None	Forbidden	15 kg	1,3	5	36
	Sodium picryl peroxide	Forbidden												
	Sodium potassium alloys, see Potassium sodium alloys.													
	Sodium salts of aromatic nitro-derivatives, n.o.s., *explosive.*	1.3C	UN0203											
	Sodium selenate, *see* Selenates *or* Selenites.													
DE	Sodium selenite (*RQ-1000/454*)	6.1	NA2630	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	
	Sodium selenite, *see* Selenates *or* Selenites.													
	Sodium sulfide, anhydrous *or* Sodium sulfide *with less than 30 per cent water of crystallization.*	4.2	UN1385	II	SPONTANEOUSLY COMBUSTIBLE.	A19, A20, N34.	None	212	241	15 kg	50 kg	1,3	1,3	52
	Sodium sulfide, hydrated *with not less than 30 per cent water.*	8	UN1849	II	CORROSIVE	T8	154	212	240	15 kg	50 kg	1,2	1,2	26
	Sodium superoxide	5.1	UN2547	I	OXIDIZER	A20, N34	None	211	None	Forbidden	15 kg	1,2	5	13, 31, 45, 46
	Sodium tetranitride	Forbidden												
	Sounding devices, explosive	1.2F	UN0204											
	Sounding devices, explosive	1.1F	UN0296											
	Sounding devices, explosive	1.1E	UN0374											
	Sounding devices, explosive	1.2E	UN0375											
	Spirits of salt, see Hydrochloric acid													
	Squibs	1.4B	UN0422											
	Squibs	1.4G	UN0423											
	Squibs, *including electric squibs and safety squibs.*	1.4S	UN0206											
	Stannic chloride, anhydrous	8	UN1827	II	CORROSIVE	B2, T8, T26.	154	202	242	1 L	30 L	1	1	8
	Stannic chloride, pentahydrate	8	UN2440	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
	Stannic phosphides	4.3	UN1433	I	DANGEROUS WHEN WET.	A19	None	211	242	Forbidden	15 kg	1,3	5	85
	Steel swarf, *see* Ferrous metal borings, *etc.*													

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Stibine	2.3	UN2676	1B	POISON GAS, FLAMMABLE GAS.	10	None	304	245	Forbidden	Forbidden	1	5	40
	Storage batteries, wet, see Batteries, wet etc..													
	Strontium arsenite	6.1	UN1691	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Strontium chlorate	5.1	UN1506	II	OXIDIZER	A1, B10, N13, N34, T8.	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
DE	Strontium chromate (*RQ-1000/454*)	ORM-E	NA9149	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Strontium nitrate	5.1	UN1507	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,2	1,2	
	Strontium perchlorate	5.1	UN1508	II	OXIDIZER	B10, T8	152	212	240	5 kg	25 kg	1,2	1,2	46
	Strontium peroxide	5.1	UN1509	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	13
	Strontium phosphide	4.3	UN2013	I	DANGEROUS WHEN WET, POISON.	A19	None	211	None	Forbidden	15 kg	1,3	5	40, 85
E	Strychnine *or* Strychnine salts (*RQ-10/4.54*).	6.1	UN1692	I	POISON		None	211	242	Forbidden	50 kg	1,2	1,2	40, 95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
	Styphnic acid, *see* Trinitroresorcinol, *etc.*													
E	Styrene monomer, inhibited (*RQ-1000/454*)	3	UN2055	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Substances, explosive, n.o.s.	1.1L	UN0357											
	Substances, explosive, n.o.s.	1.2L	UN0358											
	Substances, explosive, n.o.s.	1.3L	UN0359											
	Substances which in contact with water emit flammable gases, n.o.s. *liquid.*	4.3	UN2813	I	DANGEROUS WHEN WET.	A2, A19	None	201	244	Forbidden	1 L	1,3	5	40
				II	DANGEROUS WHEN WET.	A2, A19	None	203	243	1 L	5 L	1,3	5	40
				III	DANGEROUS WHEN WET.	A2, A19	None	203	241	5 L	60 L	1,3	1,3	40
I	Substances which in contact with water emit flammable gases, n.o.s. (solid).	4.3	UN2813	I	DANGEROUS WHEN WET.		None	211	242	Forbidden	15 kg	1,3	5	
	Substituted nitrophenol pesticides, liquid, flammable, toxic, n.o.s., *flash point less than 23 degrees C.*	3	UN2780	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	5	
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	
	Substituted nitrophenol pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23 degrees C.*	6.1	UN3013	I	POISON, FLAMMABLE LIQUID.	T42	None	201	243	1 L	30 L	1	1	21, 40, 95
				II	POISON, FLAMMABLE LIQUID.	T14	None	202	243	5 L	60 L	1,2	1	21, 40, 95
				III	KEEP AWAY FROM FOOD.	B1, T14	153	203	242	60 L	220 L	1,2	1,2	21, 34, 40
	Substituted nitrophenol pesticides, liquid, toxic, n.o.s..	6.1	UN3014	I	POISON	T42	None	201	243	1 L	30 L	1	1	40, 95

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
				II	POISON	T14	None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Substituted nitrophenol pesticides, solid, toxic, n.o.s..	6.1	UN2779	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	40, 95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34, 40
	Succinic acid peroxide, *see* Disuccinic acid peroxide.													
	Sucrose octanitrate (dry)	Forbidden												
E	Sufuric acid (*RQ-1000/450*) *over 65.25% concentration.*	8	UN1830	II	CORROSIVE	B2, N1, N26, N34, T9, T27.	None	202	242	1 L	30 L	1,2	1	33, 38, 83
	Sulfamic acid	8	UN2967	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
	Sulfur	4.1	UN1350	III	FLAMMABLE SOLID.	A1	151	213	240	25 kg	100 kg	1,3	1,3	19, 74
	Sulfur and chlorate, loose mixtures of	Forbidden												
	Sulfur chloride (*mono*) *see* Sulfur chlorides													
E	Sulfur chlorides (*RQ-1000/454*)	8	UN1828	I	CORROSIVE	B4, B6, N1, N25, N35, T18, T27.	None	201	242	Forbidden	2.5 L	1	1	8
	Sulfur dichloride, see Sulfur chlorides													
	Sulfur dioxide, liquefied	2.3	UN1079	II	POISON GAS	B14, B33, 10.	None	304	314, 315	Forbidden	Forbidden	1,3	5	40, 85, 95
	Sulfur dioxide solution, see Sulfurous acid													
	Sulfuretted hydrogen, see Hydrogen sulfide, liquefied.													
	Sulfur hexafluoride	2.2	UN1080		NONFLAMMABLE GAS.	B13	306	304	244	75 kg	150 kg	1,3	1,3	85
E	Sulfuric acid, fuming (*RQ-1000/454*)	8	UN1831	I	CORROSIVE, POISON.	N1, N11, N26, N34.	None	201	243	Forbidden	2.5 L	1,2	1	14, 33, 38, 40
E	Sulfuric acid, spent (*RQ-1000/454*) *over 65.25% concentration.*	8	UN1832	II	CORROSIVE	B2, N1, N26, N34, T9, T27.	None	202	242	Forbidden	30 L	1,2	1	
E	Sulfuric acid, spent *up to 65.25% concentration*(*RQ-1000/454*).	8	UN1832	II	CORROSIVE	B2, N1, N26, N34, T9, T27.	None	202	242	Forbidden	30 L	1,2	1	14, 33, 38

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
E	Sulfuric acid *up to 65.25% concentration(RQ-1000/454).*	8	UN1830	II	CORROSIVE	B2, B15, N1, N26, N34, T9, T27.	154	202	242	1 L	30 L	1,2	1	14, 33, 38
	Sulfuric and hydrofluoric acid mixtures. *see* Hydrofluoric and sulfuric acid mixtures.													
	Sulfuric anhydride, see Sulfur trioxide, inhibited.													
	Sulfur, molten	4.1	UN2448	III	FLAMMABLE SOLID.	T9, T38	None	213	241	Forbidden	Forbidden	1	1	74
	Sulfurous acid	8	UN1833	II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1,2	1	40
	Sulfur tetrafluoride	2.3	UN2418	IA	POISON GAS	10	None	302	245	Forbidden	Forbidden	1	5	40, 95
	Sulfur trioxide, inhibited	8	UN1829	I	CORROSIVE	B4, B12, B29, N16, N26, N34, T18, T27.	None	201	242	Forbidden	25 kg	1,2	1,2	90, 38, 40
D	Sulfur trioxide, unihibited	8	NA1829	I	CORROSIVE	B4, B12, B14, B29, N16, N26, N34.	None	201	243	Forbidden	Forbidden	1,2	1,2	98, 13, 28
	Sulfuryl chloride	8	UN1834	I	CORROSIVE	B4, B6, N1, N11, N26, N34, T18, T27.	None	201	242	0.5 L	2.5 L	1	1	80, 40
	Sulfuryl fluoride	2.3	UN2191	III	POISON GAS	B34, 10	None	304	314, 315	Forbidden	Forbidden	1,3	5	40, 85, 95
DE	2,4,5-T. *See* 2,4,5-Trichlorophenoxyacetic acid..													
D	2,4,5-T amine, ester, *or* salt. *See* 2,4,5-Trichlorophenoxyacetic acid, amine, ester, *or* salt.													
	Tars, liquid *including road asphalt and oils, bitumen and cut backs.*	3	UN1999	II	FLAMMABLE LIQUID.	T7, T30	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	T7, T30	150	203	242	60 L	220 L	1,3	1,3	
DE	TDE (*1,1-Dichloro-2,2-bis(p-chlorophenyl) ethane*) (*RQ-1/0.454*).	6.1	NA2761	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
	Tear gas candles	6.1	UN1700	II	POISON, FLAMMABLE SOLID.		None	340	None	Forbidden	35 kg	1	5	24, 40, 95

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification Nos.	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***) Exceptions	Non-bulk packaging	Bulk packaging	(9) Quantity limitations Passenger aircraft or railcar	Cargo aircraft only	(10) Vessel stowage requirements Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Tear gas cartridges, see Ammunition, tear-producing, *etc.*.													
D	Tear gas devices *with more than 2 per cent tear gas substances, by mass.*	2.3	NA1693	II	POISON GAS	10	None	340	None	Forbidden	Forbidden	1	5	40, 95
	Tear gas devices, with not more than 2 per cent tear gas substances, by mass, see Aerosols, *etc.*.													
	Tear gas grenades, see Tear gas candles													
	Tear gas substances, n.o.s., liquid	6.1	UN1693	I	POISON		None	201	None	Forbidden	Forbidden	1	5	
				II	POISON		None	202	None	Forbidden	5 L	1	5	40, 95
	Tear gas substances, n.o.s., solid	6.1	UN1693	II	POISON		None	212	None	Forbidden	25 kg	1	5	95
	Tellurium hexafluoride	2.3	UN2195	II	POISON GAS	B14, B31, 10.	None	302	244	Forbidden	Forbidden	1	5	40, 85, 95
	Terpene hydrocarbons, n.o.s.	3	UN2319	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Terpinolene	3	UN2541	III	FLAMMABLE LIQUID.	T1	150	203	242	60 L	220 L	1,3	1,3	
	Tetraazido benzene quinone	Forbidden												
A	Tetrabromoethane	6.1	UN2504	III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	1,2	34
	Tetrachloroethane	6.1	UN1702	II	POISON	N36	None	202	243	5 L	60 L	1,2	1,2	40, 95
	Tetrachloroethylene	6.1	UN1897	III	KEEP AWAY FROM FOOD.	N36	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Tetraethylammonium perchlorate (dry)	Forbidden												
	Tetraethyl dithiopyrophosphate and gases in solution *or* Tetraethyl dithiopyrophosphate and gases mixtures *LC50 less than or equal to 200 ppm.*	2.3	UN1703	II	POISON GAS	10	None	334	245	Forbidden	Forbidden	1	5	40, 85, 95
	Tetraethyl dithiopyrophosphate and gases in solution *or* tetraethyl dithiopyrophphate and gas mixtures *LC50 over 200 up to 500 ppm.*	2.3	UN1703	II	POISON GAS	B14, B40, 10.	None	334	244	Forbidden	Forbidden	1	5	40
	Tetraethyl dithiopyrophosphate, dry	6.1	UN1704	I	POISON	49	None	211	242	Forbidden	50 kg	1	5	95
				II	POISON	49	None	212	242	Forbidden	100 kg	1	5	95
				III	KEEP AWAY FROM FOOD.	49	153	213	240	Forbidden	200 kg	1	5	34
	Tetraethyl dithiopyrophosphate, liquid	6.1	UN1704	I	POISON	N76	None	201	243	Forbidden	30 L	1	5	40, 95
				II	POISON	N76	None	202	243	Forbidden	60 L	1	5	40, 95
				III	KEEP AWAY FROM FOOD.	N76	None	203	241	Forbidden	220 L	1	5	34, 40
AW	Tetraethylenepentamine	8	UN2320	III	CORROSIVE	T2	154	203	241	5 L	60 L	1,2	1,2	8
DE	Tetraethyl lead, liquid (*RQ-100/45.4*)	6.1	NA1649	I	POISON	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1	5	40, 95
E	Tetraethyl pyrophosphate and compressed gas mixtures (*RQ-100/45.4*)*LC50 less than or equal to 200 ppm.*	2.3	UN1705	II	POISON GAS	10	None	334	245	Forbidden	Forbidden	1	5	40, 85, 95

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
E	Tetraethyl pyrophosphate and compressed gas mixtures (*RQ-100/45.4*) *LC50 over 200 ppm up to 5000 ppm.*	2.3	UN1705	II	POISON GAS	B14, B40, 10.	None	334	244	Forbidden	Forbidden	1	5	40
DE	Tetraethyl pyrophosphate, *(liquid)* (*RQ-100/45.4*).	6.1	NA2783	I	POISON		None	201	243	Forbidden	1 L	1,3	5	
DE	Tetraethyl pyrophosphate (*solid*) (*RQ-100/45.4*).	6.1	NA2783	I	POISON	N77	None	211	242	Forbidden	50 kg	1,3	5	
	Tetraethyl silicate	3	UN1292	III	FLAMMABLE LIQUID.	T1	150	203	241	5 L	60 L	1,3	1	
	Tetrafluoroethylene, inhibited	2.1	UN1081		FLAMMABLE GAS.	B13	306	304	244	Forbidden	150 kg	1,3	5	40, 85
	Tetrafluoromethane	2.2	UN1982		NONFLAMMABLE GAS.	B13	None	302	244	75 kg	150 kg	1,3	1,3	85
	1,2,3,6-Tetrahydrobenzaldehyde	3	UN2498	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Tetrahydrofuran	3	UN2056	II	FLAMMABLE LIQUID.	T8	None	202	242	Forbidden	60 L	1,3	5	12
	Tetrahydrofurfurylamine	3	UN2943	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Tetrahydronaphthyl hydroperoxide *or* Tetralin hydroperoxide, *pure.*	5.2	UN2136	I	ORGANIC PEROXIDE.		None	225	None	1 kg	5 kg	1	5	12, 40
	Tetrahydrophthalic anhydrides	8	UN2698	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	
	1,2,3,6-Tetrahydropyridine	3	UN2410	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	40
	Tetrahydrothiophene	3	UN2412	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	
	Tetralin hydroperoxide, *see* Tetrahydronaphthyl hydroperoxide.													
	Tetramethylammonium hydroxide	8	UN1835	II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1,2	1,2	
	1,1,3,3-Tetramethylbutyl hydroperoxide, *technically pure.*	5.2	UN2160	II	ORGANIC PEROXIDE.		152	225	None	5 L	10 L	1	5	12, 40
	1,1,3,3-Tetramethylbutyl peroxy-2-ethylhexanoate, *technically pure.*	5.2	UN2161	I	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Tetramethylene diperoxide dicarbamide	Forbidden												
	Tetramethylsilane	3	UN2749	I	FLAMMABLE LIQUID.	T21, T26	None	201	243	Forbidden	30 L	1	5	12, 25
	Tetranitroaniline	1.1D	UN0207											
	Tetranitro diglycerin	Forbidden												
	Tetranitromethane	5.1	UN1510	I	OXIDIZER		None	201	None	Forbidden	Forbidden	1	5	40, 66, 92
	2,3,4,6-Tetranitrophenol	Forbidden												
	2,3,4,6-Tetranitrophenyl methyl nitramine	Forbidden												
	2,3,4,6-Tetranitrophenylnitramine	Forbidden												
	Tetranitroresorcinol (dry)	Forbidden												

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification Nos.	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***) Exceptions	Non-bulk packaging	Bulk packaging	(9) Quantity limitations Passenger aircraft or rail car	Cargo aircraft only	(10) Vessel stowage requirements Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	2,3,5,6-Tetranitroso-1,4-dinitrobenzene	Forbidden												
	2,3,5,6-Tetranitroso nitrobenzene (dry)	Forbidden												
	Tetrapropylorthotitanate	3	UN2413	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1,3	
	Tetrazene, *see* Guanyl nitrosaminoguanyltetrazene.													
	Tetrazine (dry)	Forbidden												
	Tetrazol-1-acetic acid	1.4C	UN0407											
	Tetrazolyl azide (dry)	Forbidden												
	Tetryl, *see* Trinitrophenylmethyl nitramine													
I	Textile waste, wet, n.o.s.	4.2	UN1857	III	SPONTANEOUSLY COMBUSTIBLE.		None	213	241	Forbidden	Forbidden	1,3	1,3	
	Thallium chlorate	5.1	UN2573	II	OXIDIZER, POISON.		None	212	242	5 kg	25 kg	1,2	1,2	46, 56, 95
	Thallium compounds, n.o.s.	6.1	UN1707	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34
	Thallium nitrate	6.1	UN2727	II	POISON		None	212	242	5 kg	25 kg	1,2	1,2	89, 95
DE	Thallium sulfate, solid (*RQ-1000/454*)	6.1	NA1707	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	
	Thia-4-pentanal	6.1	UN2785	I	POISON	B14, B32, 10.	None	227	244	Forbidden	Forbidden	1	1,3	40, 95
	Thioacetic acid	3	UN2436	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Thiocarbonylchloride, see Thiophosgene													
	Thioglycol	6.1	UN2966	II	POISON	T8	None	202	243	5 L	60 L	1,2	1,2	95
	Thioglycolic acid	8	UN1940	II	CORROSIVE	B2, N26, N34.	154	202	242	1 L	30 L	1,2	1,2	9
	Thiolactic acid	6.1	UN2936	II	POISON	T8	None	212	242	25 kg	100 kg	1,2	1,2	95
	Thionyl chloride	8	UN1836	I	CORROSIVE	B4, N1, N11, N34, N35.	None	201	242	Forbidden	2.5 L	1	1	80, 40
	Thiophene	3	UN2414	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Thiophosgene	6.1	UN2474	I	POISON	B14, B32, N26, N33, N34, 10.	None	227	244	Forbidden	Forbidden	1,2	1	26, 40, 95

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Thiophosphoryl chloride	8	UN1837	II	CORROSIVE	B2, B6, B25, N1, N26, N34, T12.	None	202	242	Forbidden	30 L	1	1	80, 40
	Thorium metal, pyrophoric	7	UN2975		RADIOACTIVE, SPONTANEOUSLY COMBUSTIBLE.		None	418	None	Forbidden	Forbidden	1,2	1,2	
	Thorium nitrate, solid	7	UN2976		RADIOACTIVE, OXIDIZER.		None	419	None	Forbidden	15 kg	1,2	1,2	
	Tin chloride, fuming, see Stannic chloride, anhydrous.													
	Tinctures, medicinal	3	UN1293	II	FLAMMABLE LIQUID.	T8, T31	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	241	60 L	220 L	1,3	1,3	
	Tinning flux, see Zinc chloride													
	Tin perchloride or Tin tetrachloride, see Stannic chloride, anhydrous.													
	Titanium hydride	4.1	UN1871	II	FLAMMABLE SOLID.	A19, A20, N34.	None	212	241	15 kg	50 kg	1,3	5	
	Titanium powder, dry (a) *mechanically produced, particle size between 3 and 53 microns; (b) chemically produced, particle size between 10 and 840 microns.*	4.2	UN2546	II	SPONTANEOUSLY COMBUSTIBLE.	A19, A20, N5, N34.	None	212	241	5 kg	50 kg	1	5	
	Titanium powder, wetted *with not less than 25 per cent water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns.*	4.1	UN1352	II	FLAMMABLE SOLID.	A19, A20, B10, N34.	None	212	240	15 kg	50 kg	1,3	5	
	Titanium sponge granules *or* Titanium sponge powders.	4.1	UN2878	III	FLAMMABLE SOLID.	A1	None	213	240	25 kg	100 kg	1	5	
D	Titanium sulfate solution	8	NA1760	II	CORROSIVE	B2, B15	None	213	242	1 L	30 L	1,2	1,2	
	Titanium tetrachloride	8	UN1838	I	CORROSIVE, POISON.	B14, B32, B41, N1, N11, N34, N41, 10.	None	227	244	Forbidden	Forbidden	1	1	80, 40
	Titanium trichloride mixtures	8	UN2869	II	CORROSIVE	N26, N34	154	212	240	15 kg	50 kg	1,2	1,2	40
	Titanium trichloride, pyrophoric *or* Titanium trichloride mixtures, pyrophoric.	4.2	UN2441	II	SPONTANEOUSLY COMBUSTIBLE, CORROSIVE.	A19, A20, N2, N26, N34.	None	212	244	15 kg	50 kg	1,3	1,3	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	TNT, *see* Trinitrotoluene, *etc.*													
	TNT mixed with aluminum, see Tritonal													
	Toe puffs, *nitrocellulose base*	4.1	UN1353	III	FLAMMABLE SOLID.	A1	None	213	240	25 kg	100 kg	1	5	
E	Toluene (*RQ-1000/454*)	3	UN1294	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Toluene diisocyanate	6.1	UN2078	II	POISON	T14	None	202	243	Forbidden	60 L	1,2	1	22, 25, 40, 95
	Toluene sulfonic acid, *see* Alkyl, Aryl *or* Toluene sulfonic acid *etc.*													
	Toluidines (*liquid*)	6.1	UN1708	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	26, 95
	Toluidines (*solid*)	6.1	UN1708	II	POISON		None	212	241	25 kg	100 kg	1,2	1,2	95
	2,4-Toluylenediamine	6.1	UN1709	III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	1,2	34
	Torpedoes *with bursting charge*	1.1E	UN0329											
	Torpedoes *with bursting charge*	1.1F	UN0330											
DE	Toxaphene (*RQ-1/0.454*)	6.1	NA2761	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	
DE	2,4,5-TP. *See* 2,4,5-Trichlorophenoxypropionic acid *or* acid ester.													
DE	2,4,5-TP ester. *See* 2,4,5-Trichlorophenoxypropionic acid ester.													
	Tracers for ammunition	1.3G	UN0212											
	Tracers for ammunition	1.4G	UN0306											
	Tractors, see Vehicles, self propelled													
	Triallylamine	3	UN2610	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	40
	Triallyl borate	6.1	UN2609	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,3	1,3	12, 13, 22, 25, 34
	Triazine pesticides, liquid, flammable, toxic, n.o.s., *flash point less than 23deg C.*	3	UN2764	I	FLAMMABLE LIQUID, POISON.		None	201	243	Forbidden	30 L	1,3	5	
				II	FLAMMABLE LIQUID, POISON.		None	202	243	1 L	60 L	1,3	1	
	Triazine pesticides, liquid, toxic, flammable, n.o.s., *flash point not less than 23deg C.*	6.1	UN2997	I	POISON, FLAMMABLE LIQUID.	T42	None	201	243	1 L	30 L	1	1	21, 40, 95
				II	POISON, FLAMMABLE LIQUID.	T14	None	202	243	5 L	60 L	1,2	1	21, 40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	242	60 L	220 L	1,2	1,2	21, 40, 34
	Triazine pesticides, liquid, toxic, n.o.s.	6.1	UN2998	I	POISON	T42	None	201	243	1 L	30 L	1	1	40, 95
				II	POISON	T14	None	202	243	5 L	60 L	1,2	1	40, 95
				III	KEEP AWAY FROM FOOD.	T14	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Triazine pesticides, solid, toxic, n.o.s.	6.1	UN2763	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	40, 95
				II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	40, 95

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
				III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	34, 40
	Tri-(1-aziridinyl)phosphine oxide, solution	6.1	UN2501	II	POISON	T8	None	202	243	5 L	60 L	1,2	1,2	95
	Tributylamine	8	UN2542	III	CORROSIVE	T1	None	203	241	5 L	60 L	1,2	1,2	
DE	Trichlorfon (*RQ-1000/454*)	6.1	NA2783	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	
	Trichloroacetic acid	8	UN1839	II	CORROSIVE	N26, N34	154	212	240	15 kg	50 kg	1,2	1,2	
	Trichloroacetic acid, solution	8	UN2564	II	CORROSIVE	B2, N1, N11, N26, N34, T8.	154	202	242	1 L	30 L	1,2	1	8
	Trichloroacetyl chloride	8	UN2442	II	CORROSIVE	B2, N1, N16, N17, N26, N34, T9, T26.	None	202	242	Forbidden	Forbidden	1	5	40
	Trichlorobenzenes, liquid	6.1	UN2321	III	KEEP AWAY FROM FOOD.	T7	153	203	241	60 L	220 L	1,2	1,2	34
	Trichlorobutene	6.1	UN2322	II	POISON	T8	None	202	243	5 L	60 L	1,2	1,2	25, 40, 95
	1,1,1-Trichloroethane	6.1	UN2831	III	KEEP AWAY FROM FOOD.	N36, T7	153	203	241	60 L	220 L	1,2	1,2	34, 40
E	Trichloroethylene (*RQ-1000/454*)	6.1	UN1710	III	KEEP AWAY FROM FOOD.	N36, T1	153	203	241	60 L	220 L	1,2	1,2	34, 40
	Trichloroisocyanuric acid, dry	5.1	UN2468	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	13, 25, 72
	Trichloromethyl perchlorate	Forbidden												
DE	Trichlorophenol (*RQ-10/4.54*)	6.1	NA2020	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	No limit	1,2	1,2	
DE	2,4,5-Trichlorophenoxyacetic acid, acid amine, acid ester, *or* acid salt(*RQ-100/45.4*).	ORM-E	NA2765	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	2,4,5-Trichlorophenoxypropionic acid or acid ester (*RQ-100/45.4*).	ORM-E	NA2765	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Trichlorosilane	4.3	UN1295	I	DANGEROUS WHEN WET, FLAMMABLE LIQUID, CORROSIVE.	N16, N26, N34, T24, T26.	None	201	244	Forbidden	Forbidden	1	5	40
D	(mono-(Trichloro) tetra-(monopotassium dichloro)-penta-s-triazinetrione, dry (*containing over 39% available chlorine*).	5.1	NA2468	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,3	1,3	
	Trichloro-s-triazinetrione dry, containing over 39% available chlorine, see Trichloroisocyanuric acid, dry.													

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Tricresyl phosphate *with more than 3 per cent ortho isomer.*	6.1	UN2574	II	POISON	N1, N16, N33, N34, T8.	None	202	243	5 L	60 L	1,2	1,2	95
DE	Triethanolamine dodycylbenzenesulfonate (*RQ-1000/454*).	ORM-E	NA9151	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Triethylamine	3	UN1296	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	40
	Triethylene tetramine	8	UN2259	II	CORROSIVE	B2, T8	154	202	242	1 L	30 L	1,2	1	26, 40, 71
	Triethyl phosphite	3	UN2323	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	52
	Trifluoroacetic acid	8	UN2699	I	CORROSIVE	B4, N1, N3, N11, N26, N34, T18, T27.	None	201	242	0.5 L	2.5 L	1,3	1	12, 38, 40
	Trifluorochloroethylene, inhibited	2.1	UN1082		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	Trifluoroethane, compressed	2.1	UN2035		FLAMMABLE GAS.	B13	306	304	244	Forbidden	150 kg	1,3	1	40, 85
	Trifluoromethane	2.2	UN1984		NONFLAMMABLE GAS.		306	304	314, 315	75 kg	150 kg	1,3	1,3	85
D	Trifluoromethane and chlorctrifluoromethane mixture (*constant boiling mixture*) (*R-503*). *See* Refrigerant gas, n.o.s.													
	3-Trifluoromethylaniline	6.1	UN2948	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	40, 95
	2-Trifluoromethylaniline	6.1	UN2942	III	KEEP AWAY FROM FOOD.		153	203	241	60 L	220 L	1,2	1,2	34
	Trifornoxime trinitrate	Forbidden												
	Triisobutylene	3	UN2324	II	FLAMMABLE LIQUID.	T7, T30	150	203	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1,3	
	Triisocyanatoisocyanurate of isophoronediisocyanate, solution, *70 per cent, by weight.*	3	UN2906	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Triisopropyl borate	3	UN2616	II	FLAMMABLE LIQUID.	T8, T31	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T8, T31.	150	202	242	60 L	220 L	1,3	1,3	
D	Trimethoxysilane	6.1	NA1992	I	POISON, FLAMMABLE LIQUID.	B3, B14, B32.	None	201	244	Forbidden	Forbidden	1,3	5	12

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							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Trimethyl acetyl chloride	8	UN2438	II	CORROSIVE, FLAMMABLE LIQUID.	B2, B6, N1, N11, N26, N34, T8, T26.	None	202	243	1 L	30 L	1	5	21, 25, 40
E	Trimethylamine, anhydrous (*RQ-1000/454*)	2.1	UN1083		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1	5	40, 85
E	Trimethylamine, aqueous solutions *not more than 50 per cent trimethylamine by weight* (*RQ-1000/454*).	3	UN1297	II	FLAMMABLE LIQUID.	T42	150	202	242	5 L	60 L	1,3	1	40, 41
				III	FLAMMABLE LIQUID.	B1, T14	150	203	242	60 L	220 L	1,3	1,3	40, 41
	1,3,5-Trimethylbenzene (mesitylene)	3	UN2325	I	FLAMMABLE LIQUID, POISON.	B14	None	201	243	60 L	220 L	1,3	1,3	
	Trimethyl borate	3	UN2416	II	FLAMMABLE LIQUID.	T14	150	202	242	5 L	60 L	1,3	1	
	Trimethylchlorosilane	3	UN1298	I	FLAMMABLE LIQUID, POISON, CORROSIVE.	B14, B30, N1, N26, N34, 10.	None	226	244	Forbidden	Forbidden	1,3	5	
	Trimethylcyclohexylamine	8	UN2326	III	CORROSIVE	T2	154	203	241	5 L	60 L	1,2	1,2	8
	Trimethylene glycol diperchlorate	Forbidden												
	Trimethylhexamethylenediamines	8	UN2327	III	CORROSIVE	T7	154	203	241	5 L	60 L	1,2	1,2	8
	Trimethylhexamethylenediisocyanate	6.1	UN2328	III	KEEP AWAY FROM FOOD.	T8	153	203	241	60 L	220 L	1,2	1	34
	Trimethylol nitromethane trinitrate	Forbidden												
	2,4,4-Trimethylpentyl-2-peroxy phenoxy acetate, *not more than 37 per cent in solution.*	5.2	UN2961	II	ORGANIC PEROXIDE.		None	225	None	Forbidden	Forbidden	1	5	20, 40
	Trimethyl phosphite	3	UN2329	III	FLAMMABLE LIQUID.	T1	150	203	242	60 L	220 L	1,3	1,3	
	1,3,5-Trimethyl-2,4,6-trinitrobenzene	Forbidden												
	Trinitroacetic acid	Forbidden												
	Trinitroacetonitrile	Forbidden												
	Trinitroamine cobalt	Forbidden												
	Trinitroaniline	1.1D	UN0153											
	Trinitroanisole	1.1D	UN0213											
	Trinitrobenzene, *dry or wetted with less than 30 per cent water, by weight.*	1.1D	UN0214											
	Trinitrobenzenesulfonic acid	1.1L	UN0386											

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Trinitrobenzene, wetted *with not less than 30 per cent water, by weight.*	4.1	UN1354	I	FLAMMABLE SOLID.	A2, A19, N2, N34, N41.	None	211	None	0.5 kg	0.5 kg	1	5	36
	Trinitrobenzoic acid, *dry or wetted with less than 30 per cent water, by weight.*	1.1D	UN0215											
	Trinitrobenzoic acid, wetted *with not less than 30 per cent water, by weight.*	4.1	UN1355	I	FLAMMABLE SOLID.	A2, A19, N2, N34, N41.	None	211	None	0.5 kg	0.5 kg	1,3	5	36
	Trinitrochlorobenzene	1.1D	UN0155											
	Trinitro-m-cresol	1.1D	UN0216											
	2,4,6-Trinitro-1,3-diazobenzene	Forbidden												
	Trinitroethanol	Forbidden												
	Trinitroethylnitrate	Forbidden												
	Trinitrofluorenone	1.1D	UN0387											
	Trinitromethane	Forbidden												
	1,3,5-Trinitronaphthalene	Forbidden												
	Trinitronaphthalene	1.1D	UN0217											
	Trinitrophenetole	1.1D	UN0218											
	Trinitrophenol (Picric acid), *dry or wetted with less than 30 per cent water, by weight.*	1.1D	UN0154											
	Trinitrophenol, wetted *with not less than 30 per cent water, by weight.*	4.1	UN1344	I	FLAMMABLE SOLID.	A19, N2, N34, N41.	None	211	None	1 kg	15 kg	1	5	36
	2,4,6-Trinitrophenyl guanidine (dry)	Forbidden												
	Trinitrophenylmethylnitramine (Tetryl)	1.1D	UN0208											
	2,4,6-Trinitrophenyl nitramine	Forbidden												
	2,4,6-Trinitrophenyl trimethylol methyl nitramine trinitrate (dry).	Forbidden												
	Trinitroresorcinol (Styphnic acid), *dry or wetted with less than 20 per cent water, by weight, or mixture of alcohol and water.*	1.1D	UN0219											
	Trinitroresorcinol (Styphnic acid), wetted *with not less than 20 per cent water, by weight, or mixture of alcohol and water.*	1.1D	UN0394											
	2,4,6-Trinitroso-3-methyl nitraminoanisole	Forbidden												
	Trinitrotetramine cobalt nitrate	Forbidden												

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Trinitrotoluene (TNT) and Trinitrobenzene mixtures *or* Trinitrotoluene (TNT) and Hexanitrostilbene mixtures.	1.1D	UN0388											
	Trinitrotoluene (TNT), *dry or wetted with less than 30 per cent water, by weight.*	1.1D	UN0209											
	Trinitrotoluene (TNT) mixtures containing Trinitrobenzene and Hexanitrostilbene.	1.1D	UN0389											
	Trinitrotoluene (TNT), wetted *with not less than 30 per cent water, by weight.*	4.1	UN1356	I	FLAMMABLE SOLID.	A2, A19, N2, N34, N41.	None	211	None	0.5 kg	0.5 kg	1,3	5	36
	2,4,6-Trinitro-1,3,5-triazido benzene (dry)	Forbidden												
	Tri-(b-nitroxyethyl) ammonium nitrate	Forbidden												
	Tripropylamine	3	UN2260	II	FLAMMABLE LIQUID, CORROSIVE.	T8	None	202	243	1 L	5 L	1,3	1	40
	Tripropylene	3	UN2057	II	FLAMMABLE LIQUID.		150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.		150	203	242	60 L	220 L	1,3	1,3	
	Tris, bis-bifluoroamino diethoxy propane (TVOPA).	Forbidden												
	Tritonal	1.1D	UN0390											
	Tungsten hexafluoride	2.3	UN2196	IB	POISON GAS	B14, B31, 10.	None	338	244	Forbidden	Forbidden	1	5	40, 85, 95
	Turpentine	3	UN1299	III	FLAMMABLE LIQUID.	B1	150	203	242	60 L	220 L	1,3	1,3	
I	Turpentine substitute	3	UN1300	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Undecane	3	UN2330	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Uranium hexafluoride, fissile (*containing more than 1% U-235*).	7	UN2977		RADIOACTIVE, CORROSIVE.		453	417	None			1,2	1,2	
	Uranium hexafluoride, *fissile excepted or non-fissile.*	7	UN2978		RADIOACTIVE, CORROSIVE.		421	425	425					
	Uranium metal, pyrophoric	7	UN2979		RADIOACTIVE, SPONTANEOUSLY COMBUSTIBLE.		None	418	None	Forbidden	Forbidden	1,2	1,2	
DE	Uranyl acetate (*RQ-5000/2270*)	7	NA9180		RADIOACTIVE		421, 425	415, 416	None			1,2	1,2	
E	Uranyl nitrate hexahydrate solution (*RQ-5000/2270*).	7	UN2980		RADIOACTIVE, CORROSIVE.		421, 425	415, 416, 417	None			1,2	1,2	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
E	Uranyl nitrate, solid (*RQ-5000/2270*)	7	UN2981		RADIOACTIVE, OXIDIZER.		None	419	None	Forbidden		1,2	1,2	
	Urea hydrogen peroxide	5.1	UN1511	III	OXIDIZER	A1, A29, N26.	152	213	240	25 kg	100 kg	1,2	1,2	13, 25
	Urea nitrate, *dry or wetted with less than 20 per cent water, by weight.*	1.1D	UN0220											
	Urea nitrate, wetted *with not less than 20 per cent water, by weight.*	4.1	UN1357	I	FLAMMABLE SOLID.	A19, N2, N34, N41.	None	211	None	1 kg	15 kg	1,3	1,3	
	Urea peroxide, see Urea hydrogen peroxide.													
	Valeraldehyde	3	UN2058	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
	Valeric acid, see Corrosive liquids, n.o.s.													
	Valeryl chloride	8	UN2502	II	CORROSIVE	B2, N1, N11, N26, N34, T8.	154	202	242	1 L	30 L	1	1	40
	Vanadium oxytrichloride	8	UN2443	II	CORROSIVE	B2, B16, N1, N11, N16, N26, N34, T8, T26.	154	202	242	Forbidden	30 L	1	1	40
DE	Vanadium pentoxide *fused(RQ-1000/454)*	ORM-E	NA2862	III	None		156	213	240	No limit	No limit	1,2	1,2	
E	Vanadium pentoxide, *nonfused form (RQ-1000/454).*	6.1	UN2862	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Vanadium tetrachloride	8	UN2444	I	CORROSIVE	B4, N1, N11, N26, N34, T8, T26.	None	201	242	Forbidden	2.5 L	1	1	80, 40
AW	Vanadium trichloride	8	UN2475	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	40
	Vanadium trioxide, *nonfused form*	6.1	UN2860	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Vanadyl sulfate	6.1	UN2931	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
DE	Vanadyl sulfate (*RQ-1000/454*)	ORM-E	NA9152	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Vehicles, self-propelled *including internal combustion engines or other apparatus containing an internal combustion engine or electric storage battery(see also* Wheel chair, electric).	9	None	III	None		220	220	None	No limit	No limit	1,2	1,2	
	Very signal cartridge, see Cartridges, signal.													
E	Vinyl acetate, inhibited (*RQ-1000/454*)	3	UN1301	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Vinyl bromide, inhibited	2.1	UN1085		FLAMMABLE GAS.	B13	306	304	244	Forbidden	150 kg	1,3	1	40, 85
	Vinyl butyrate, inhibited	3	UN2838	II	FLAMMABLE LIQUID.	T7	150	202	242	5 L	60 L	1,3	1	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Vinyl chloride, inhibited	2.1	UN1086		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	Vinyl chloroacetate	6.1	UN2589	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	21, 95
	Vinyl ethyl ether, inhibited	3	UN1302	I	FLAMMABLE LIQUID.	N1, N15, T14.	None	201	243	Forbidden	30 L	1,3	5	12
	Vinyl fluoride, inhibited	2.1	UN1860		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
E	Vinylidene chloride, inhibited (*RQ-5000/2270*).	3	UN1303	I	FLAMMABLE LIQUID.	T23, T29	150	201	243	1 L	30 L	1,3	5	12
	Vinyl isobutyl ether, inhibited	3	UN1304	II	FLAMMABLE LIQUID.	T8	150	202	242	5 L	60 L	1,3	1	
	Vinyl methyl ether, inhibited	2.1	UN1087		FLAMMABLE GAS.		306	304	314, 315	Forbidden	150 kg	1,3	1	40, 85
	Vinyl nitrate polymer	Forbidden												
	Vinyl pyridenes, inhibited	6.1	UN3073	II	POISON, FLAMMABLE LIQUID.	T8	None	212	243	5 L	60 L	1,3	1,3	
				III	KEEP AWAY FROM FOOD.	T8	153	213	241	60 L	220 L	1,3	1,3	
	Vinyl toluene, inhibited *mixed isomers*	3	UN2618	III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
	Vinyltrichlorosilane, inhibited	3	UN1305	I	FLAMMABLE LIQUID, CORROSIVE.	B6, N1, N26, N34, T14, T26.	None	201	243	Forbidden	2.5 L	1,3	1	40
	Warheads, rocket *with burster or expelling charge.*	1.4D	UN0370											
	Warheads, rocket *with burster or expelling charge.*	1.4F	UN0371											
	Warheads, rocket *with bursting charge*	1.1D	UN0286											
	Warheads, rocket *with bursting charge*	1.2D	UN0287											
	Warheads, rocket *with bursting charge*	1.1F	UN0369											
	Warheads, torpedo *with bursting charge*	1.1D	UN0221											
	Water reactive substances, n.o.s., see Substances which in contact with water, *etc.*													
A	Wheel chair, electric (*spillable or nonspillable type batteries*).	9	None	III	None		222	222	None	No limit	No limit	1,2	1,2	
	White acid, see Hydrofluoric acid mixtures													
	Wood preservatives, liquid	3	UN1306	II	FLAMMABLE LIQUID.	T7, T30	150	202	242	5 L	60 L	1,3	1	40
				III	FLAMMABLE LIQUID.	B1, T7, T30.	150	203	242	60 L	220 L	1,3	1,3	40
I	Wool waste, wet	4.2	UN1387	III	SPONTANEOUSLY COMBUSTIBLE.		None	213	241	Forbidden	Forbidden	1,3	1,3	
	Xenon	2.2	UN2036		NONFLAMMABLE GAS.	B13	306	302	244	75 kg	150 kg	1,3	1,3	85

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
	Xenon, refrigerated liquid	2.2	UN2591		NONFLAMMABLE GAS.		320	316	318	50 kg	500 kg	1,3	1	85
E	Xylenes (*RQ-1000/454*)	3	UN1307	II	FLAMMABLE LIQUID.	T1	150	202	242	5 L	60 L	1,3	1	
				III	FLAMMABLE LIQUID.	B1, T1	150	203	242	60 L	220 L	1,3	1,3	
E	Xylenols (*RQ-1000/454*)	6.1	UN2261	II	POISON	T8	None	212	243	25 kg	100 kg	1,2	1,2	40, 95
	Xylidines	6.1	UN1711	II	POISON	T14	None	202	243	5 L	60 L	1,2	1,2	26, 95
	Xylyl bromide	6.1	UN1701	I	POISON	B14, B30, N1, N11, N26, N33, 10.	None	226	244	Forbidden	Forbidden	1	5	40, 95
	p-Xylyl diazide	Forbidden												
	Yercury oleate	6.1	UN1640	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
DE	Zinc acetate (*RQ-1000/454*)	ORM-E	NA9153	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Zinc ammonium chloride (*RQ-5000/2270*)	ORM-E	NA9154	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Zinc ammonium nitrite	5.1	UN1512	II	OXIDIZER	B10	None	212	240	5 kg	25 kg	1,3	5	
	Zinc arsenate *or* Zinc arsenite *or* Zinc arsenate and Zinc arsenite mixtures..	6.1	UN1712	II	POISON		None	212	242	25 kg	100 kg	1,2	1,2	95
	Zinc ashes	4.3	UN1435	III	DANGEROUS WHEN WET.	A1, A19	None	213	241	25 kg	100 kg	1,3	1,3	
	Zinc bisulfite solution *see* Bisulfites, inorganic aqueous solutions, n.o.s..													
DE	Zinc borate (*RQ-1000/454*)	ORM-E	NA9155	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Zinc bromate	5.1	UN2469	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,2	1,2	46, 56
DE	Zinc bromide (*RQ-5000/2270*)	ORM-E	NA9156	III	None		156	213	240	No limit	No limit	1,2	1,2	
DE	Zinc carbonate (*RQ-1000/454*)	ORM-E	NA9157	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Zinc chlorate	5.1	UN1513	II	OXIDIZER	B10, N13, N34.	152	212	240	5 kg	25 kg	1,2	1,2	46, 56
E	Zinc chloride, anhydrous (*RQ-5000/2270*)	8	UN2331	III	CORROSIVE		None	213	240	25 kg	100 kg	1,2	1,2	
E	Zinc chloride, solution (*RQ-5000/2270*)	8	UN1840	III	CORROSIVE	T7	154	203	241	5 L	60 L	1,2	1,2	
E	Zinc cyanide (*RQ-10/4.54*)	6.1	UN1713	I	POISON		None	211	242	5 kg	50 kg	1,2	1,2	26, 95
E	Zinc dithionite *or* Zinc hydrosulfite (*RQ-1000/454*).	9	UN1931	III	None		155	204	240	100 kg	200 kg	1,2	1,2	13, 26
	Zinc ethyl, see Diethylzinc													
DE	Zinc fluoride (*RQ-1000/454*)	ORM-E	NA9158	III	None		156	213	240	No limit	No limit	1,2	1,2	
E	Zinc fluorosilicate (*RQ-5000/2270*)	6.1	UN2855	III	KEEP AWAY FROM FOOD.		153	213	240	100 kg	200 kg	1,2	1,2	26, 34
DE	Zinc formate (*RQ-1000/454*)	ORM-E	NA9159	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Zinc hydrosulfite, *see* Zinc dithionite													
	Zinc muriate solution, see Zinc chloride, solution.													
E	Zinc nitrate (*RQ-5000/2270*)	5.1	UN1514	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	
	Zinc permanganate	5.1	UN1515	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	56, 69
	Zinc peroxide	5.1	UN1516	II	OXIDIZER	B10	152	212	240	5 kg	25 kg	1,2	1,2	13
DE	Zinc phenolsulfonate (*RQ-5000/2270*)	ORM-E	NA9160	III	None		156	213	240	No limit	No limit	1,2	1,2	

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	(8) Packaging authorizations (§173.***)			(9) Quantity limitations		(10) Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
E	Zinc phosphide (*RQ-1000/454*)	4.3	UN1714	I	DANGEROUS WHEN WET, POISON.	A19	None	211	None	Forbidden	15 kg	1,3	5	85
	Zinc powder *or* Zinc dust	4.3	UN1436	II	DANGEROUS WHEN WET, SPONTANEOUSLY COMBUSTIBLE.	A19	None	212	242	15 kg	50 kg	1,3	1,3	
	Zinc resinate	4.1	UN2714	III	FLAMMABLE SOLID.	A1	151	213	240	25 kg	100 kg	1,3	1,3	
	Zinc selenate, *see* Selenates *or* Selenites													
	Zinc selenite, *see* Selenates *or* Selenites													
	Zinc silicofluoride, see Zinc fluorosilicate													
DE	Zinc sulfate (*RQ-1000/454*)	ORM-E	NA9161	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Zirconium, dry, *coiled wire, finished metal sheets, strip (thinner than 254 microns but not thinner than 18 microns).*	4.1	UN2858	III	FLAMMABLE SOLID.	A1	151	213	240	25 kg	100 kg	1,3	1,3	
	Zirconium, dry, *finished sheets, strip or coiled wire.*	4.2	UN2009	III	SPONTANEOUSLY COMBUSTIBLE.	A1, A19	None	213	240	25 kg	100 kg	1	5	
	Zirconium hydride	4.1	UN1437	II	FLAMMABLE SOLID.	A19, A20, N34.	None	212	240	15 kg	50 kg	1,3	5	
E	Zirconium nitrate (*RQ-5000/2270*)	5.1	UN2728	III	OXIDIZER	A1, A29	152	213	240	25 kg	100 kg	1,2	1,2	25
	Zirconium picramate, *dry or wetted with less than 20 per cent water, by weight.*	1.3C	UN0236											
	Zirconium picramate, wetted *with not less than 20 per cent water, by weight.*	4.1	UN1517	I	FLAMMABLE SOLID.	N34, N41	None	211	None	Forbidden	15 kg	1	5	36
DE	Zirconium potassium fluoride (*RQ-5000/2270*).	ORM-E	NA9162	III	None		156	213	240	No limit	No limit	1,2	1,2	
	Zirconium powder, dry (*a*) *mechanically produced, particle size between 3 and 53 microns; (b) chemically produced, particle size between 10 and 840 microns.*	4.2	UN2008	II	SPONTANEOUSLY COMBUSTIBLE.	A19, A20, N5, N34.	None	212	241	15 kg	50 kg	1	5	
	Zirconium powder, wetted *with not less than 25 per cent water (a visible excess of water must be present) (a) mechanically produced, particle size less than 53 microns; (b) chemically produced, particle size less than 840 microns.*	4.1	UN1358	II	FLAMMABLE SOLID.	A19, A20, N34.	None	212	241	15 kg	50 kg	1,3	5	
	Zirconium scrap	4.2	UN1932	III	SPONTANEOUSLY COMBUSTIBLE.	B10, N34	None	213	240	Forbidden	Forbidden	1	5	
DE	Zirconium sulfate (*RQ-5000/2270*)	8	NA9163	III	CORROSIVE	N34	None	213	240	50 kg	No limit	1,2	1,2	
	Zirconium suspended in a liquid	3	UN1308	II	FLAMMABLE LIQUID.		None	202	242	Forbidden	60 L	1	5	12

Symbols	Hazardous materials descriptions and proper shipping names	Hazard class	Identification numbers	Packing group	Labels	Special provisions	Packaging authorizations (§173.***)			Quantity limitations		Vessel stowage requirements		
							Exceptions	Non-bulk packaging	Bulk packaging	Passenger aircraft or railcar	Cargo aircraft only	Cargo vessel	Passenger vessel	Other stowage provisions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8A)	(8B)	(8C)	(9A)	(9B)	(10A)	(10B)	(10C)
E	Zirconium tetrachloride (RQ-5000/2270)	8	UN2503	III	CORROSIVE		154	213	240	25 kg	100 kg	1,2	1,2	

§ 172.102 Special provisions.

(a) *General.* When Column 7 of the § 172.101 Table refers to a special provision for a hazardous material, the meaning and requirements of that provision are as set forth in this section. When a special provision specifies packagings or packaging requirements, they are in addition to the standard requirements for all packagings prescribed in § 173.24 of this subchapter and any other applicable packaging requirements in Subparts A and B of Part 173 of this subchapter.

(b) *Description of codes for special provisions.* Special provisions may contain packaging provisions, prohibitions, exceptions from requirements for particular quantities or forms of materials and requirements or prohibitions applicable to specific modes of transportation, as follows:

(1) A code consisting only of numbers (for example, "11") is multi-modal in application and may apply to bulk and non-bulk packagings.

(2) A code containing the letter "A" refers to a special provision which applies only to transportation by aircraft.

(3) A code containing the letter "B" refers to a special provision which applies only to bulk packaging requirements. Unless otherwise provided in this subchapter, these special provisions do not apply to IM portable tanks.

(4) A code containing the letter "H" refers to a special provision which applies only to transportation by highway.

(5) A code containing the letter "N" refers to a special provision which applies only to non-bulk packaging requirements.

(6) A code containing the letter "R" refers to a special provision which applies only to transportation by rail.

(7) A code containing the letter "T" refers to a special provision which applies only to transportation in IM portable tanks.

(8) A code containing the letter "W" refers to a special provision which applies only to transportation by water.

(c) *Tables of special provisions.* The following tables list, and set forth the requirements of, the special provisions referred to in Column 7 of the § 172.101 Table.

(1) *Numeric provisions.* These provisions are multi-modal and apply to bulk and non-bulk packagings:

Code	Special provisions
10	Packagings shall be marked "INHALATION HAZARD" in accordance with Subpart D of Part 172.
11	The hazardous material must be packaged as either a liquid or a solid, as appropriate, depending on its physical form at 55° C (131° F) at atmospheric pressure.
17	Aqueous solutions of hydrogen peroxide containing less than 8 percent hydrogen peroxide are not subject to the requirements of this subchapter.
22	If the hazardous material is in dispersion in organic liquid, the organic liquid must have a flash point above 50° C (122° F).
28	The dihydrated sodium salt of dichloroisocyanuric acid is not subject to the requirements of this subchapter.
31	Materials which have undergone sufficient heat treatment to render them nonhazardous are not subject to the requirements of this subchapter.
33	Ammonium nitrites and mixtures of an inorganic nitrite with an ammonium salt are prohibited.
42	Fish meal or fish scrap may not be offered for transportation if the temperature of the material exceeds 49° C (120.2° F).
66	The organic peroxide included in a Polyester resin kit must be specifically listed in the § 172.101 Table and be permitted for transportation.

(2) *"A" codes.* These provisions apply only to transportation by aircraft:

Code	Special provisions
A1	Single packagings are not permitted on passenger aircraft.
A2	Single packagings are not permitted on aircraft.
A4	Liquids having an inhalation toxicity of Packing Group I are not permitted on aircraft.
A5	Solids having an inhalation toxicity of Packing Group I are not permitted on passenger aircraft and may not exceed a maximum net quantity per package of 15 kg (33.1 pounds) on cargo aircraft.
A19	Combination packagings consisting of outer fiber drums or plywood drums, with inner plastic packagings, are not authorized for transportation by aircraft.
A20	Plastic bags as inner receptacles of combination packagings are not authorized for transportation by aircraft.
A29	Combination packagings consisting of outer expanded plastic boxes with inner plastic bags are not authorized for transportation by aircraft.
A33	Ammonium nitrites and mixtures of an inorganic nitrite with an ammonium salt are prohibited.

(3) *"B" codes.* These provisions apply only to bulk packagings:

Code	Special provisions
B1	If the material has a flash point at or above 100° F (37.8° C) and below 200° F (93.3° C), then the bulk packaging requirements of § 173.241 of this subchapter are applicable. If the material has a flash point of less than 100° F, then the bulk packaging requirements of § 173.242 of this subchapter are applicable.
B2	MC 306 cargo tanks, DOT 57 portable tanks, and riveted tank cars are not authorized.
B4	Riveted tank cars, AAR 206 tank cars, MC 306 cargo tanks, and DOT 57 portable tanks are not authorized.
B5	Lading temperature may not exceed 240° F (115.6° C). Only the following bulk packagings are authorized for ammonium nitrate solutions with 15 percent or more water: DOT 103 ALW, 111A60 ALW tank cars and MC 307 and MC 312 cargo tanks with at least 25 psig (172.4 kPa) design pressure. The packaging shall be designed for a working temperature of at least 250° F (121.1° C). Transportation by vessel is not authorized.
B6	Packagings shall be made of steel.
B7	Safety relief devices are not authorized. Openings for safety relief devices shall be plugged or blank flanged.
B8	Packagings shall be made of nickel, stainless steel, or steel with nickel, stainless steel, lead or other suitable corrosion resistant metallic lining.
B9	Bottom outlets are not authorized.
B10	Packagings must be leak tight.
B11	Tank cars must have a test pressure of at least 300 psi (2,068.5 kPa). Cargo and portable tanks must have a design pressure of at least 175 psig (1,206.6 kPa). Pressure relief devices on any tank must be set to function at 175 psig (1,206.6 kPa).
B12	Tank cars and tank car tanks shall be marked with the name of the lading in accordance with the requirements of § 172.330.
B13	For compressed gases, §§ 173.314 and 173.315 of this subchapter specify authorized packagings, package pressure ratings and filling requirements.
B14	Each tank shall be thermally insulated by completely covering it with at least 100 millimeters (3.94 inches) of cork or other suitable insulation material of sufficient thickness that the overall thermal conductance is not more than 0.080 Btu per hour per square foot per degree Fahrenheit differential.
B15	Packagings shall be protected with non-metallic linings impervious to the lading unless the tanks conform to the provisions of § 178.343-2(c) of this subchapter.
B16	The lading shall be completely covered with an inert gas.
B17	Packagings shall be made of aluminum.
B18	Open steel hoppers or bins are authorized.
B19	The hazardous material may not exceed 45% concentration in a non-volatile solvent.
B20	The hazardous material may not exceed 50% concentration in a non-volatile solvent.
B21	The hazardous material may not exceed 60% concentration in a non-volatile solvent.
B22	The hazardous material may not exceed 90% concentration in a non-volatile solvent.
B23	Tanks shall be made of steel that is rubber lined or unlined. Unlined tanks shall be passivated before being placed in service. If unlined tanks are washed out with water, they shall be repassivated prior to return to service. Lading in unlined tanks must be inhibited so that the corrosive effect on steel is not greater than that of hydrofluoric acid of 65% concentration.
B24	Molybdenum content of stainless steel may not exceed 0.5%.
B25	Packagings shall be made from monel or nickel or monel-lined or nickel-lined steel.
B26	Tanks shall be insulated. Insulation must be at least 4 inches (101.6 mm) thick except that 2 inches of insulation is authorized for tanks with exterior heating jackets. Interior heating coils are not authorized. The lading shall be immersed in water or blanketed with an inert gas and loaded at a temperature not exceeding 140° F (60° C). After unloading, the tank shall be filled to its entire capacity with an inert gas or with water having a temperature not exceeding 140° F (60° C). Before a tank car is offered for return movement, it shall be placarded with "FLAMMABLE SOLID-RESIDUE" placards as described in § 172.525. When lading is immersed in water, tanks may not have bottom outlets.
B27	Tanks must have a service pressure of 150 psig (1,034.3 kPa). Tank cars and tank car tanks must have a test pressure rating of 200 psi (1,379 kPa). Lading shall be blanketed at all times with a dry inert gas at a pressure not to exceed 15 psig (103.4 kPa).
B28	Packagings shall be made of stainless steel.
B29	When the lading is transported in a molten state, tanks may be equipped with heating coils except that interior heating coils are prohibited. Standpipe heaters for tank cars are permitted.
B30	MC 330 and MC 331 cargo tanks and DOT 51 portable tanks shall be made of stainless steel except that steel other than stainless steel may be used in accordance with the provisions of § 173.24b(c). Thickness of stainless steel for tank shell and heads for cargo tanks and portable tanks must be the greater of 0.300 inch (7.62 mm) or the thickness required for a tank with a design pressure at least equal to 1.5 times the vapor pressure of the lading at 115° F (46.1° C). Notwithstanding the provisions of § 173.244(a) of this subchapter, only DOT 105J500W tank cars and DOT Class 106 and 110 tank car tanks are authorized.

Code	Special provisions
B31	MC 330 and MC 331 cargo tanks and DOT 51 portable tanks shall be made of stainless steel except that steel other than stainless steel may be used in accordance with the provisions of § 173.24b(c). Thickness of stainless steel for tank shell and heads for cargo tanks and portable tanks must be the greater of 0.300 inch (7.62 mm) or the thickness required for a tank with a design pressure at least equal to 1.5 times the vapor pressure of the lading at 115° F (46.1° C). Notwithstanding the provisions of §§ 173.243(a) and 173.244(a) of this subchapter, only DOT 105J300W, 112J340W and 114J340W tank cars and DOT Class 106 and 110 tank car tanks are authorized.
B32	MC 330 and MC 331 cargo tanks and DOT 51 portable tanks shall be made of stainless steel except that steel other than stainless steel may be used in accordance with the provisions of § 173.24b(c). Thickness of stainless steel for tank shell and heads for cargo tanks and portable tanks must be the greater of 0.250 inch (6.35 mm) or the thickness required for a tank with a design pressure at least equal to 1.3 times the vapor pressure of the lading at 115° F (46.1° C). Notwithstanding the provisions of § 173.244(a) of this subchapter, only DOT 105J300W, 112J340W and 114J340W tank cars and DOT Class 106 and 110 tank car tanks are authorized.
B33	MC 330 or MC 331 cargo tanks and DOT 51 portable tanks shall be made of stainless steel except that steel other than stainless steel may be used in accordance with the provisions of § 173.24b(c). Thickness of stainless steel for tank shell and heads for cargo tanks and portable tanks must be the greater of 0.250 inch (6.35 mm) or the thickness required for a tank with a design pressure at least equal to 1.2 times the vapor pressure of the lading at 115° F (46.1° C). Notwithstanding the provisions of §§ 173.243(a) and 173.244(a) of this subchapter, only DOT 105J300W, 112J340W and 114J340W tank cars and DOT Class 106 and 110 tank car tanks are authorized.
B34	MC 330 or MC 331 cargo tanks and DOT 51 portable tanks shall be made of stainless steel with a design pressure at least equal to 1.1 times the vapor pressure of the lading at 115° F (46.1° C). Steel other than stainless steel may be used in accordance with the provisions of § 173.24b(c).
B35	If LC50 is more than 200 ppm but not more than 1000 ppm, Note B31 applies. If LC50 is more than 1000 ppm but not more than 3000 ppm, Note B33 applies. If LC50 is more than 3000 ppm but not more than 5000 ppm, Note B34 applies.
B36	Only DOT 105J500W tank cars or DOT Class 106 or 110 tank car tanks are authorized.
B37	The amount of nitric oxide charged into any tank car or tank car tank may not exceed 200 psig (1,379 kPa) at 70° F (21.1° C). The amount of nitric oxide charged into cargo or portable tanks may not exceed 200 psig (1,379 kPa) at 70° F (21.1° C) or 0.55 times tank design pressure (MAWP) whichever is less.
B38	If LC50 is more than 1000 ppm but not more than 3000 ppm, Note B31 applies. If LC50 is more than 3000 ppm but not more than 5000 ppm, Note B33 applies.
B39	Mixtures with flashpoints less than 23° C (73.4° F) must bear FLAMMABLE placards as prescribed in Subpart F of Part 172.
B40	For liquid materials which are toxic by inhalation (see § 173.133(a)(2) of this subchapter), if LC50 is 200 ppm or less, Note B30 applies; if LC50 is more than 200 ppm but not more than 1000 ppm, Note B32 applies.
B41	Notwithstanding the periodic retest intervals specified in Retest Table 1 of 173.31 of this subchapter, the retest interval for safety relief valves on each single-unit tank car tank is 2 years and the retest interval on the tank and interior heater systems, if any, is as follows: a. For a tank 10 years old or newer, 5 years; b. For a tank older than 10 years but not older than 22 years, 3 years; and c. For a tank older than 22 years, 1 year.

(4) *"H" codes.* These provisions apply only to transportation by highway: (Reserved.)

(5) *"N" codes.* These provisions apply only to non-bulk packagings:

Code	Special provisions
N1	For combination packagings, if glass inner packagings (including ampoules) are used, they must be packed with absorbent material in tightly closed metal receptacles before packing in outer packagings.
N2	For combination packagings, if glass inner packagings (including ampoules) are used, they must be packed with cushioning material in tightly closed metal receptacles before packing in outer packagings.
N3	Glass inner packagings are permitted in combination or composite packagings only if the hazardous material is free from hydrofluoric acid.
N4	For combination or composite packagings, glass inner packagings, other than ampoules, are not permitted.
N5	Glass materials of construction are not authorized for any part of a packaging which is normally in contact with the hazardous material.
N11	For combination packagings, if plastic inner packagings are used, they must be packed in tightly closed metal receptacles before packing in outer packagings.
N12	Plastic packagings are not authorized.
N13	For combination packagings, if plastic bags are used, they must be packed in tightly closed metal receptacles before packing in outer packagings.
N14	Only plastic bags are permitted as inner packagings for combination packagings.
N15	Plastic materials of construction are not authorized for any part of a packaging which is normally in contact with the hazardous material.
N16	Plastic single packagings are not authorized.
N17	Plastic composite packagings are not authorized.
N25	Steel single packagings are not authorized.
N26	Steel packagings must be corrosion-resistant or have protection against corrosion.
N32	Aluminum materials of construction are not authorized for single packagings.
N33	Aluminum drums are not authorized.
N34	Aluminum materials of construction are not authorized for any part of a packaging which is normally in contact with the hazardous material.
N35	When aluminum or aluminum alloy materials of construction are used, they must be resistant to corrosion.
N36	Aluminum or aluminum alloy materials of construction are permitted only for halogenated hydrocarbons that will not react with aluminum.
N40	For combination packagings, when metal inner packagings are permitted, only specification cylinders constructed of metals which are compatible with the hazardous material may be used.
N41	Metal (other than aluminum) materials of construction are not authorized for any part of a packaging which is normally in contact with the hazardous material.
N42	Metal (other than aluminum) materials of construction are not authorized for single packagings.
N43	Metal drums are permitted as single packagings only if constructed of nickel or monel.
N44	Only metal packagings are authorized.
N45	For combination packagings, only copper cartridges are permitted as inner packagings when the hazardous material is not in dispersion.
N55	For combination packagings, fiber drums (1G) only are permitted as outer packagings.
N65	Outage must be sufficient to prevent cylinders or spheres from becoming liquid full at 55° C (130° F). The vacant space (outage) may be charged with a nonflammable nonliquefied compressed gas if the pressure in the cylinder or sphere at 55° C (130° F) does not exceed 125% of the marked service pressure.
N70	For combination packagings, only plywood boxes (4D) and fiberboard boxes (4G) are permitted as outer packagings.
N71	Combination packagings consisting of inner glass packagings of not over 1.0 liter (1.06 quarts) capacity each or inner metal packagings of not over 5.0 liters (5.28 quarts) capacity each, placed in strong outer packagings, are authorized. Packagings are not subject to the requirements of Part 178 of this subchapter.
N72	Packagings must be examined by the Bureau of Explosives and approved by the Director, OHMT.
N73	Packagings consisting of outer wooden or fiberboard boxes with inner glass, metal or other strong containers; metal or fiber drums; kegs or barrels; or strong metal cans are authorized and need not conform to the requirements of Part 178 of this subchapter.
N74	Packages consisting of tightly closed inner containers of glass, earthenware, metal or polyethylene, capacity not over 0.5 kg (1.1 pounds) securely cushioned and packed in outer wooden barrels or wooden or fiberboard boxes, not over 15 kg (33.1 pounds) net weight, are authorized and need not conform to the requirements of Part 178 of this subchapter.
N75	Packages consisting of tightly closed inner packagings of glass, earthenware or metal, securely cushioned and packed in outer wooden barrels or wooden or fiberboard boxes, capacity not over 2.5 kg (5.51 pounds) net weight, are authorized and need not conform to the requirements of Part 178 of this subchapter.
N76	For materials of not more than 25 percent active ingredient by weight, packages consisting of inner metal packagings not greater than 250 mL (8.5 fluid ounces) capacity each, packed in strong outer packagings together with sufficient absorbent material to completely absorb the liquid contents are authorized and need not conform to the requirements of Part 178 of this subchapter.
N77	For materials of not more than two percent active ingredients by weight, packagings need not conform to the requirements of Part 178 of this subchapter, if liquid contents are absorbed in an inert material.
N78	Packages consisting of inner glass, earthenware, or polyethylene or other nonfragile plastic bottles or jars not over 0.5 kg (1.1 pounds) capacity each, or metal cans not over five pounds capacity each, packed in outer wooden boxes, barrels or kegs, or fiberboard boxes are authorized and need not conform to the requirements of Part 178 of this subchapter. Net weight of contents in fiberboard boxes may not exceed 65 pounds (29.5 kg). Net weight of contents in wooden boxes, barrels or kegs may not exceed 100 pounds (45.4 kg).
N79	Packages consisting of tightly closed metal inner packagings not over 0.5 kg (1.1 pounds) capacity each, packed in outer wooden or fiberboard boxes, or wooden barrels, are authorized and need not conform to the requirements of Part 178 of this subchapter. Net weight of contents may not exceed 15 kg (33.1 pounds).
N80	Packages consisting of one inner metal can, not over 2.5 kg (5.51 pounds) capacity, packed in an outer wooden or fiberboard box, or a wooden barrel, are authorized and need not conform to the requirements of Part 178 of this subchapter.

(6) *"R" codes.* These provisions apply only to transportation by rail: (Reserved.)

(7) *"T" codes.* These provisions apply only to transportation in IM portable tanks. They are divided into two groupings, one of which appears as the IM Tank Table in paragraph (c)(7)(i) of this section, and the second of which imposes specific requirements and appears in paragraph (a)(7)(ii) of this section.

(i) *IM Tank Table.* Column 1 lists the

code for the special provisions as specified in Column 7 of the § 172.101 Table. Column 2 specifies the IM tank type, either IM 101 (§§ 178.270 and 178.271 of this subchapter) or IM 102 (§§ 178.270 and 178.272 of this subchapter). Column 3 specifies the minimum test pressure, in bars (1 bar=14.5 psig), at which the periodic hydrostatic testing required by § 173.32b of this subchapter must be conducted. Column 4 specifies either the section referenced for requirements for bottom openings or "Prohibited", which means bottom openings are prohibited. Column 5 specifies the section reference for requirements applicable to pressure relief devices.

IM TANK TABLE

Code (1)	IM tank type (2)	Minimum test pressure (Bars) (3)	Bottom outlets (4)	Pressure relief devices (5)
T1	102	1.5	§ 173.32c(g)(1)	§ 178.270–11(a)(1), (2).
T2	102	1.5	§ 173.32c(g)(2)	§ 178.270–11(a)(1), (2).
T7	101	2.65	§ 173.32c(g)(1)	§ 178.270–11(a)(1), (2).
T8	101	2.65	§ 173.32c(g)(2)	§ 178.270–11(a)(1), (2).
T9	101	2.65	Prohibited	§ 178.270–11(a)(1), (2).
T11	101	2.65	§ 173.32c(g)(2)	§ 178.270–11(a)(3).
T12	101	2.65	Prohibited	§ 178.270–11(a)(3).
T13	101	4	§ 173.32c(g)(1)	§ 178.270–11(a)(1), (2).
T14	101	4	§ 173.32c(g)(2)	§ 178.270–11(a)(1), (2).
T15	101	4	Prohibited	§ 178.270–11(a)(1), (2).
T16	101	4	§ 173.32c(g)(1)	§ 178.270–11(a)(3).
T17	101	4	§ 173.32c(g)(2)	§ 178.270–11(a)(3).
T18	101	4	Prohibited	§ 178.270–11(a)(3).
T20	101	6	§ 173.32c(g)(2)	§ 178.270–11(a)(1), (2).
T21	101	6	Prohibited	§ 178.270–11(a)(1), (2).
T23	101	6	§ 173.32c(g)(2)	§ 178.270–11(a)(3).
T24	101	6	Prohibited	§ 178.270–11(a)(3).
T26	101	10	Prohibited	§ 178.270–11(a)(1), (2).
T39	101	10	Prohibited	§ 178.270–11(a)(3).

(ii) *IM Tank special provisions. These provisions apply only to transportation in IM portable tanks:*

Code	Special provisions
T25	This hazardous material is not permitted for transport in IM portable tanks.
T26	Each tank with a diameter of greater than 1.8 meters (5.91 feet) must have a minimum shell thickness of 6.35mm (0.250 inch) mild steel.
T27	Each tank with a diameter of greater than 1.8 meters (5.91 feet) must have a minimum shell thickness of 8.0mm (0.315 inch) mild steel.
T29	The lading shall be completely covered with nitrogen or an inert gas
T30	IM 102 portable tanks without bottom openings authorized for a hazardous material with a flash point of 32 °F (0 °C) or greater and a vapor pressure not greater than 9.5 psia (65.5 kPa) at 150 °F (65.6 °C).
T31	IM 102 portable tanks without bottom openings or with bottom openings conforming to § 173.32c(g)(2) of this subchapter are authorized for a hazardous material with a flash point of 32 °F (0 °C) or greater and a vapor pressure not greater than 9.5 psia (65.5 kpa) at 150 °F (65.6 °C).
T32	Each tank with a diameter of greater than 1.8 meters (5.91 feet) must have a minimum shell thickness of 10.0mm (0.394 inch) mild steel with at least 5.0mm (0.197 inch) lead lining.
T33	Dry phosphorus is not permitted. For transport in a molten state, the tank shall be insulated in accordance with Note T38. Air shall be eliminated from the interior of the tank. The tank may be heated, however, interior heating coils are prohibited.
T35	Each tank shall be equipped with reclosing (spring loaded) pressure relief valves set to discharge at pressures determined according to the pressure characteristics of the organic peroxide lading.
T36	Each tank shall be equipped with pressure relief devices with sufficient venting capacity to prevent the tank from bursting.
T37	Tert-butyl hydroperoxide may not exceed 65% concentration in water, unless otherwise approved by the Director, OHMT. Each tank shall be made of aluminum of at least 99.5% purity, stainless steel or carbon steel. The material of construction must be compatible with the lading. The tank shall be equipped with pressure relief devices impervious to the lading. Aluminum tanks and carbon steel tanks shall be insulated in accordance with Note T38.
T38	Each tank shall be thermally insulated by completely covering it with at least 100 millimeters (3.94 inches) of cork or other suitable insulation material of sufficient thickness that the overall thermal conductance is not more than 0.080 Btu per hour per square foot per degree Fahrenheit differential.
T40	Each tank with a diameter of greater than 1.8 meters (5.91 feet) must have a minimum shell thickness of 10.0mm (0.394 inch) mild steel.
T41	Each tank with a diameter of greater than 1.8 meters (5.91 feet) must have a minimum shell thickness of 12.0mm (0.472 inch) mild steel.
T42	Transport in IM portable tanks is permitted only under conditions approved by the Director, OHMT.

(8) *"W" codes.* These provisions apply only to transportation by water:

Code	Special provisions
W41	When offered for transportation by water, this material must be packaged in bales and be securely and tightly bound with rope, wire or similar means.

Subpart C—Shipping Papers

In § 172.200, paragraph (b) would be revised to read as follows:

§ 172.200 Applicability.

* * * * *

(b) This subpart does not apply to any material, other than a hazardous substance or waste, that is:

(1) Regulated only by air, water, or both (as indicated by the letters "A" or "W", or both, in Column 1 of the § 172.101 Table) when offered for transportation or transported in another mode of transport; or

(2) An ORM-D material, unless it is offered or intended for transportation, or transported, by aircraft.

§ 172.201 [Amended]

In § 172.201, in paragraph (a)(3), the word "subpart" would be changed to "subchapter" and paragraphs (a)(4)(i) and (a)(4)(ii) would be removed.

In § 172.202, paragraphs (a), (b), (c) and (d) would be revised, and paragraph (f) would be added to read as follows:

§ 172.202 Description of hazardous material on shipping papers.

(a) The shipping description of a hazardous material on the shipping paper must include:

(1) The proper shipping name prescribed for the material in Column 2 of the § 172.101 Table;

(2) The hazard class prescribed for the material as shown in Column 3 of the § 172.101 Table:

(i) For Class 3, the description "Combustible liquid" must appear in parentheses immediately following the hazard class if the material is classed, under § 173.120(b) of this subchapter, as a combustible liquid.

(ii) Class names, IMO class and division numbers or subsidiary hazard classes may be entered in parentheses following the numerical hazard class;

(3) The identification number prescribed for the material as shown in Column 4 of the § 172.101 Table;

(4) The packing group, if any, prescribed for the material in Column 5 of the § 172.101 Table preceded by the letters "PG"; and

(5) Except for empty packagings, the total quantity (by weight, volume or as otherwise appropriate) of the hazardous material covered by the description.

(b) Except as provided in this subpart, the basic description specified in paragraphs (a) (1), (2), (3) and (4) of this section must be shown in sequence with no additional information interspersed. For example: "Gasoline, 3, UN1203, PG II".

(c) The total quantity of the material covered by one description must appear before or after, or both before and after, the description required and authorized by this subpart. The type of packaging

and destination marks may be entered in any appropriate manner before or after the basic description. Abbreviations may be used to express units of measurement and types of packagings.

(d) Technical and chemical group names may be entered in parentheses between the proper shipping name and hazard class. An appropriate modifier, such as "contains" or "containing," may be used. For example: "Flammable liquids, n.o.s. (contains Xylene and Benzene), 3, UN1993, PG II".

* * * * *

(f) *Technical names.* If the material is described by an n.o.s. entry in the § 172.101 Table, the technical name of the material shall be entered in parentheses immediately following the proper shipping name. For example, "Corrosive liquids, n.o.s. (Caprylyl chloride), 8, UN1760, PG II". If the material is a mixture of two or more hazardous materials, the names of at least two components most predominately contributing to the hazard or hazards of the mixture shall be entered in parentheses. For example, "Flammable liquids, corrosive, n.o.s. (Methyl alcohol, Potassium hydroxide), 3, UN2924, PG II". The provisions of this paragraph do not apply:

(1) If the n.o.s. description for the material (other than a mixture of hazardous materials of different classes meeting the definitions of more than one hazard class) contains the name of the chemical element or group which is primarily responsible for the material being included in the hazard class indicated. For example: "Mercury compounds, solid, n.o.s., 6.1, UN2025, PG II".

(2) If the n.o.s. description for the material (which is a mixture of hazardous materials of different classes meeting the definition of more than one hazard class) contains the name of the chemical element or group responsible for the material meeting the definition of one of these classes. In such cases, only the technical name of the component that is not appropriately identified in the n.o.s description shall be entered in parentheses. For example: "Carbamate pesticides, liquid, flammable, toxic, n.o.s., *flash point less than 23 °C* (contains Xylene), 3(6.1), UN2758, PG II".

In § 172.203, paragraphs (i)(3) and (l) would be removed, and paragraphs (c), (i)(2), (j) and (k)(4) would be revised to read as follows:

§ 172.203 Additional description requirements.

* * * * *

(c) *Hazardous substances.* (1) If the proper shipping name for a material that is a hazardous substance does not identify the constituents making it a hazardous substance, the name or names of such hazardous substance constituents as shown in the § 172.101 Table shall be entered in association with the basic description.

(2) The letters "RQ" shall be entered on the shipping paper either before or after, or both before and after, the basic description required by § 172.202 for each hazardous substance (see definition in § 171.8). For example: "RQ, Allyl alcohol, 3, UN1098, PG I"; or "Benzonitrile, 6.1, UN2224, PG II, RQ".

* * * * *

(i) * * *

(2) The entry "skin corrosive only" must be included in association with the basic description to authorize "under deck" stowage for Corrosive liquids, n.o.s. and Corrosive solids, n.o.s. that meet only the corrosion to skin criteria of § 173.136(a) of this subchapter.

(j) *Dangerous when wet material.* The words "Dangerous when wet" shall be entered on the shipping paper in association with the basic description for a material which meets the definition of a dangerous when wet material in § 173.124(c) of this subchapter.

(k) * * *

(4) For Division 2.3 materials and for materials which meet the definition for Division 6.1, Packing Group I, and which are toxic by inhalation under the criteria specified in § 173.133(a)(2) of this subchapter, the words "Poison-Inhalation Hazard" shall be entered on the shipping paper in association with the shipping description. However, the word "Poison" need not be repeated if it otherwise appears in the shipping description.

Subpart D—Marking

Section 172.301 would be revised to read as follows:

§ 172.301 General marking requirements for non-bulk packagings.

(a) *Proper shipping name and identification number.* Except as otherwise provided by this subchapter, each person who offers for transportation a hazardous material in a non-bulk packaging shall mark the package with the proper shipping name and identification number (preceded by "UN" or "NA" as appropriate) for the material as shown in the § 172.101 Table. The proper shipping name for a hazardous waste (as defined in § 171.8 of this subchapter) is not required to include the word "waste" if the package bears the EPA marking prescribed by 40 CFR 262.32.

(b) *Technical names.* (1) In addition to the marking required by paragraph (a) of this section, a package containing a hazardous material, which is described by an n.o.s. entry in the § 172.101 Table, must be marked with the technical name of the material, in parentheses immediately following (or below) the proper shipping name. For example: "Corrosive liquids, n.o.s. (Caprylyl chloride), UN1760".

(2) If the material is a mixture of two or more hazardous materials, the names of at least two components most predominately contributing to the hazard or hazards of the mixture shall be entered in parentheses. For example: "Flammable liquids, corrosive, n.o.s. (Methanol, Potassium hydroxide), UN2924".

(3) The provisions of this paragraph do not apply:

(i) If the "n.o.s." description for the material (other than a mixture of hazardous materials of different classes meeting the definition of more than one hazard class) contains the name of the chemical element or group which is primarily responsible for the material being included in the hazard class indicated. For example: "Mercury compounds, solid, n.o.s., UN2025".

(ii) If the "n.o.s." description for the material (which is a mixture of hazardous materials of different classes meeting the definition of more than one hazard class) contains the name of the chemical element or group responsible for the material meeting the definition of one of these classes. In such cases, only the technical name of the component that is not appropriately identified in the "n.o.s." description is required to be entered in parentheses. For example: "Carbamate pesticides, liquid, flammable, toxic, n.o.s. (Xylene), UN2758".

(c) *Exemption packagings.* The outside of each package authorized by an exemption must be plainly and durably marked "DOT-E" followed by the exemption number assigned.

(d) *Previously marked packagings.* A package which has been previously marked as required for the material it contains and on which the marking remains legible, need not be remarked. (For empty packagings, see § 173.29 of this subchapter.)

(e) *Marking exceptions.* Identification numbers are not required on packages which contain only the following materials:

(1) Limited quantities as defined in § 171.8 of this subchapter;

(2) ORM-D materials.

Section 172.302 would be revised to read as follows:

§ 172.302 General marking requirements for bulk packagings.

(a) *Identification numbers.* Except as otherwise provided in this subpart, no person may offer for transportation or transport a hazardous material in a bulk packaging unless the packaging is marked as required by § 172.332 with the identification number specified for the material in the § 172.101 Table—

(1) On each side and each end, if the packaging has a capacity of 1000 gallons (3,785.4 liters) or more, or

(2) On two opposing sides, if the packaging has a capacity of less than 1000 gallons (3,785.4 liters).

(b) *Size of markings.* Except as otherwise provided, markings required by this subpart on bulk packagings must have a width of at least 6.0 mm (0.24 inches) and a height of—

(1) 100 mm (3.9 inches) for rail cars;

(2) 75 mm (3.0 inches) for cargo tanks, and

(3) 50 mm (2.0 inches) for other bulk packages.

(c) *Exemption packagings.* The outside of each bulk package used under the terms of an exemption must be plainly and durably marked "DOT–E" followed by the exemption number assigned.

(d) *Technical names.* Each bulk packaging marked with a proper shipping name which contains the term "n.o.s.", must be marked with the technical name of the hazardous material, in the manner prescribed in § 172.301(b).

(e) Each bulk packaging marked with a proper shipping name, common name or identification number as required by this subpart must remain marked when it is emptied unless it is—

(1) Sufficiently cleaned of residue and purged of vapors to remove any potential hazard; or

(2) Refilled, with a material requiring different markings or no markings, to such an extent that any residue remaining in the packaging is no longer hazardous.

(f) Specific requirements for marking portable tanks, cargo tanks, tank cars and multi-unit tank car tanks are prescribed in §§ 172.326, 172.328 and 172.330.

A new § 172.303 would be added to read as follows:

§ 172.303 Prohibited marking.

(a) No person may offer for transportation or transport a package which is marked with the proper shipping name or identification number of a hazardous material unless the package contains the identified hazardous material or its residue.

(b) This section does not apply to transportation of a package (or packaging) in a transport vehicle or freight container if the package (or packaging) is not visible during transportation and is loaded by the shipper and unloaded by the shipper or consignee.

Section 172.306 would be revised to read as follows:

§ 172.306 Consignee's or consignor's name and address.

Each person who offers for transportation a hazardous material in a non-bulk package shall mark that package with the name and address of the consignor or consignee except when the package is—

(a) Transported by highway only and will not be transferred from one motor carrier to another; or

(b) Part of a carload lot, truckload lot or freight container load, and the entire contents of the rail car, truck or freight container are shipped from one consignor to one consignee.

In § 172.308, paragraph (a)(3) would be added to read as follows:

§ 172.308 Authorized abbreviations.

(a) * * *

(3) Abbreviations which appear as authorized descriptions in Column 2 of the § 172.101 Table are authorized. For example, "PCB", "2, 4–D", etc.

Section 172.312 would be revised to read as follows:

§ 172.312 Liquid hazardous materials in non-bulk packagings.

(a) Except as provided in this section, each non-bulk package having inner packagings containing liquid hazardous materials must be:

(1) Packed with closures upward, and

(2) Legibly marked with package orientation markings as specified in ISO Standard R780–1968 on two opposite vertical sides of the package with the arrows pointing in the correct upright direction.

(b) Except as otherwise prescribed in Part 173 of this subchapter, cylinders of liquefied compressed gas are not required to be marked "THIS SIDE UP" or "THIS END UP."

(c) Arrows for purposes other than indicating proper package orientation may not be displayed on a package containing a liquid hazardous material.

(d) Except when offered or intended for transportation by aircraft, packages containing flammable liquids in inner packagings of one liter or less prepared in accordance with § 173.150 (b) or (c) of this subchapter are excepted from the requirements of paragraph (a) of this section.

(e) When offered or intended for transportation by aircraft, packages containing flammable liquids in inner packagings of one liter or less prepared in accordance with § 173.150 (b) or (c) of this subchapter are excepted from the requirements of paragraph (a) of this section when packed with sufficient absorption material between the inner and outer packagings to completely absorb the liquid contents.

A new § 172.313 would be added to read as follows:

§ 172.313 Poisonous hazardous materials.

(a) For Division 2.3 materials and for poisonous liquids subject to the "Poison-Inhalation Hazard" shipping paper description of § 172.203(k)(4), the package containing the material shall be marked "Inhalation Hazard" in association with the required label(s) or placard(s). (See § 172.302(b) for size of markings on bulk packages.) Bulk packagings must be marked on two opposing sides.

(b) Each non-bulk plastic packaging used as a single or composite packaging for materials meeting the definition of Division 6.1 (in § 173.132 of this subchapter) shall be permanently marked, by embossment or other durable means, with the word "POISON" in letters at least 6.3mm (0.25 inches) in height. Additional text or symbols related to hazard warning may be included in the marking. The marking shall be located within 150mm (5.9 inches) of the closure of the packaging.

In § 172.316, paragraph (a) and the beginning of the first sentence in paragraph (c) preceding the word "certification" are revised to read as follows:

§ 172.316 Packagings containing material classed as ORM–D or ORM–E.

(a) Each non-bulk packaging containing a material classed as ORM–D or ORM–E must be marked on at least one side or end with the appropriate ORM designation immediately following or below the proper shipping name of the material. The appropriate ORM designation must be placed within a rectangle that is approximately 6.3mm (0.25 inches) larger on each side than the designation. The appropriate designation for each ORM must be:

(1) ORM–D–AIR for an ORM–D that is prepared for air shipment and packaged in accordance with the provisions of § 173.27 of this subchapter.

(2) ORM–D for an ORM–D other than as described in subparagraph (a)(1) above,

(3) ORM–E for an ORM–E.

* * * * *

(c) The marking ORM–D or ORM–E is the * * *

Section 172.324 would be revised to read as follows:

§ 172.324 Hazardous substances in non-bulk packagings.

(a) If the proper shipping name for a material that is a hazardous substance does not identify the constituents making it a hazardous substance, the name or names of the hazardous substance constituents as shown in the § 172.101 Table shall be entered in association with the proper shipping name on each non-bulk packaging.

(b) The letters "RQ" shall be displayed in association with the proper shipping name on a non-bulk packaging that contains a hazardous substance.

Section 172.326 would be revised to read as follows:

§ 172.326 Portable tanks.

(a) *Shipping name.* No person may offer for transportation or transport a portable tank containing a hazardous material unless it is legibly marked on two opposing sides with the proper shipping name specified for the material in § 172.101.

(b) [Reserved]

(c) *Owner's name.* The name of the owner or of the lessee, if applicable, must be displayed on a portable tank that contains a hazardous material.

(d) If the identification number marking required by § 172.302(a) is not visible, a transport vehicle or freight container used to transport a portable tank must be marked on each side and each end as required by § 172.332 with the identification number specified for the material in the § 172.101 Table.

Section 172.328 would be revised to read as follows:

§ 172.328 Cargo tanks.

(a) *Providing and affixing identification numbers.* Unless a cargo tank is already marked with the identification numbers required by this subpart, the identification numbers must be provided or affixed as follows:

(1) A person who offers a motor carrier a hazardous material for transportation in a cargo tank shall provide the motor carrier the identification numbers on placards or shall affix orange panels containing the required identification numbers, prior to or at the time the material is offered for transportation.

(2) A person who offers a cargo tank containing a hazardous material for transportation shall affix the required identification numbers on panels or placards prior to or at the time the cargo tank is offered for transportation.

(b) [Reserved]

(c) *Required markings; Gases.* Except for certain nurse tanks which must be marked as specified in § 173.315(m) of this subchapter, each cargo tank transporting a Class 2 material subject to this subchapter must be marked, in lettering no less than 50mm (1.97 inches), on each side and each end with—

(1) The proper shipping name specified for the gas in the § 172.101 Table, or

(2) An appropriate common name for the material such as "Refrigerant Gas".

(d) *QT/NQT markings.* Each MC 330 and MC 331 cargo tank must be marked near the specification plate, in letters no less than 50mm (1.97 inches) in height, with—

(1) QT, if the cargo tank is constructed of quenched and tempered steel, or

(2) NQT, if the cargo tank is constructed of other than quenched and tempered steel.

In § 172.330, the phrase "or § 172.102 (when authorized)" would be removed from paragraphs (c)(2) and (e), the phrase "or § 172.102" would be removed from paragraph (c)(1), and paragraphs (a) and (b) would be revised to read as follows:

§ 172.330 Tank cars and multi-unit tank car tanks.

(a) *Shipping name.* No person may offer for transportation or transport a hazardous material—

(1) In a tank car unless the tank car is marked on each side, when required by § 172.102 or Part 173 of this subchapter, with the proper shipping name specified for the material in the § 172.101 Table or with a common name authorized in this subchapter for the material such as "Refrigerant Gas".

(2) In a multi-unit tank car tank unless the tank is marked on opposing sides with the proper shipping name specified for the material in the § 172.101 Table or with a common name authorized in this subchapter for the material.

(b) A motor vehicle or rail car used to transport a multi-unit tank car tank containing a hazardous material must be marked on each side and each end, as required by § 172.332, with the identification number specified for the material in the § 172.101 Table.

* * * * *

In § 172.332, paragraph (c)(3) would be revised to read as follows:

§ 172.332 Identification number markings.

* * * * *

(c) * * *

(3) An identification number may be displayed only on a placard corresponding to the primary hazard class of the hazardous material.

§ 172.334 [Amended]

* * * * *

In § 172.334 the phrase "POISON GAS", would be removed from paragraph (a), and the phrase "or § 172.102 (when authorized)" would be removed from paragraph (b).

Subpart E—Labeling

Section 172.400 would be revised to read as follows:

§ 172.400 General labeling requirements.

(a) Each person who offers for transportation or transports a hazardous material in any of the following packages or containment devices, shall label the package or containment device with labels specified for the material in the § 172.101 Table and in this subpart:

(1) A non-bulk package;

(2) A portable tank of less than 1000 gallons (3,785.4 liters) capacity;

(3) A DOT Specification 106 or 110 multi-unit tank car tank; and

(4) An overpack, freight container or unit load device, of no greater than 640 cubic feet (18.1 cubic meters) capacity, which contains a package for which labels are required.

(b) Labeling is required for a hazardous material which meets one or more hazard class definitions, in accordance with Column 6 of the § 172.101 Table and the following table:

Hazard class or division	Label name	Label design section reference (§)
1.1	EXPLOSIVE 1.1	172.411
1.2	EXPLOSIVE 1.2	172.411
1.3	EXPLOSIVE 1.3	172.411
1.4	EXPLOSIVE 1.4	172.411
1.5	EXPLOSIVE 1.5	172.411
2.1	FLAMMABLE GAS	172.417
2.2	NON-FLAMMABLE GAS.	172.415
2.3	POISON GAS	172.416
3 (flammable liquid)	FLAMMABLE LIQUID	172.419
3 (combustible liquid)	(None)	
4.1	FLAMMABLE SOLID	172.420
4.2	SPONTANEOUSLY COMBUSTIBLE.	172.422
4.3	DANGEROUS WHEN WET.	172.423
5.1	OXIDIZER	172.426
5.2	ORGANIC PEROXIDE	172.427
6.1 (Packing Groups I and II).	POISON	172.430
6.1 (Packing Group III)	KEEP AWAY FROM FOOD.	172.431
6.2 (international)	INFECTIOUS SUBSTANCE.	172.432
6.2 (domestic)	ETIOLOGIC AGENT	172.444

Hazard class or division	Label name	Label design section reference (§)
7 (see § 172.403)	RADIOACTIVE WHITE-I.	172.436
7	RADIOACTIVE YELLOW-II.	172.436
7	RADIOACTIVE YELLOW-III.	172.440
7 (empty packages, see § 173.427).	EMPTY	172.450
8	CORROSIVE	172.442
9	(None)	
ORM-D	(None)	
ORM-E	(None)	

A new § 172.400a would be added to read as follows:

§ 172.400a Exceptions from labeling.

(a) Notwithstanding the provisions of § 172.400, a label is not required on—

(1) A cylinder containing a compressed gas that is—

(i) Not poisonous;

(ii) Carried by a private or contract motor carrier;

(iii) Not overpacked; and

(iv) Durably and legibly marked in accordance with CGA Pamphlet C–7, Appendix A.

(2) A package or unit of military explosives (including ammunition) shipped by or on behalf of the DOD when in—

(i) Freight containerload, carload or truckload shipments, if loaded and unloaded by the shipper or DOD; or

(ii) Unitized or palletized break-bulk shipments by cargo vessel under charter to DOD if at least one required label is displayed on each unitized or palletized load.

(3) A package containing a hazardous material other than ammunition that is—

(i) Loaded and unloaded under the supervision of DOD personnel, and

(ii) Escorted by DOD personnel in a separate vehicle.

(4) A compressed gas cylinder permanently mounted in or on a transport vehicle.

(5) A freight container, an aircraft unit load device or a portable tank, which—

(i) Is placarded in accordance with Subpart F of this part, or

(ii) Conforms to paragraph(a)(3) or (b)(3) of § 172.512.

(6) An overpack or unit load device in or on which each different required label on packages of hazardous materials is visible.

(7) A package of low specific activity radioactive material, when transported under § 173.425(b) of this subchapter.

(b) Notwithstanding the provisions of § 172.402 of this subpart, a subsidiary hazard label corresponding to Class 3, Packing Group III or Class 8, Packing Group III (that is, a FLAMMABLE or CORROSIVE label, respectively) is not required to be displayed on a package containing a multiple hazard material, unless the package is offered or intended for transportation by aircraft or vessel.

(c) Certain exceptions to labeling requirements are provided for small quantities and limited quantities in applicable sections in Part 173 of this subchapter.

§ 172.401 [Amended]

In § 172.401, paragraph (d) would be removed.

Section 172.402 would be revised to read as follows:

§ 172.402 Additional labeling requirements.

(a) *Subsidiary hazard labels.* Each package containing a material meeting the definition of more than one hazard class also shall be labeled as follows:

(1) A material classed as Class (or Division) 1.1, 1.2, 2.3, or 7, shall be labeled for each subsidiary hazard class.

(2) A material classed as Division 6.1, Packing Group I or II, which meets the definition of a flammable liquid, shall be labeled with the FLAMMABLE LIQUID label.

(3) A material classed as Class (or Division) 3, 4.1, 4.2, 4.3, 5.1 or 8, which meets the definition of a Division 6.1, Packing Group I or II material, shall be labeled with the POISON label.

(4) A material classed as Class (or Division) 3, 4.1, 4.2, 4.3, 5.1, or 6.1 (Packing Group I or II) which meets the definition of Class 8, shall be labeled with the CORROSIVE label.

(5) Irrespective of hazard class, a poisonous material subject to the "Poison-Inhalation Hazard" shipping paper description of § 172.203 (k)(4), shall be labeled with the POISON or POISON GAS label, as appropriate.

(6) A material which has a subsidiary hazard of being dangerous when wet, as defined in § 173.124, shall be labeled with the DANGEROUS WHEN WET label.

(b) *CARGO AIRCRAFT ONLY label.* Each person who offers for transportation or transports by aircraft a package containing a hazardous material which is authorized on cargo aircraft only shall label the package with a CARGO AIRCRAFT ONLY label specified in § 172.448.

Section 172.405 would be revised to read as follows:

§ 172.405 Authorized label modifications.

(a) For Classes 2, 3, 4, 5, 6, or 8, text indicating a hazard (for example FLAMMABLE LIQUID) is not required on a label when—

(1) The label otherwise conforms to the provisions of this subpart, and

(2) The hazard class or division number is displayed in the lower corner of a label corresponding to the primary hazard class of the material.

(b) Except as provided in paragraph (a) of this section, class and division numbers are not required on labels for Classes 2, 3, 4, 5, 6, 7, or 8. Class and division numbers should not be displayed on subsidiary hazard labels.

Section 172.406 would be revised to read as follows:

§ 172.406 Placement of labels.

(a) *General.* (1) Except as provided in paragraphs (b) and (e) of this section, each label required by this subpart must—

(i) Be printed on or affixed to a surface (other than the bottom) of the package or containment device containing the hazardous material; and

(ii) Be located on the same surface of the package as the proper shipping name marking, if the package dimensions are adequate.

(2) Except as provided in paragraph (e) of this section, duplicate labeling is not required on a package or containment device (such as to satisfy redundant labeling requirements).

(b) *Exceptions.* A label may be printed on or placed on a securely affixed tag, or may be affixed by other suitable means to:

(1) A package that contains no radioactive material and which has dimensions less than those of the required label;

(2) A compressed gas cylinder; and

(3) A package which has such an irregular surface that a label cannot be satisfactorily affixed.

(c) *Placement of multiple labels.* When primary and subsidiary hazard labels are required, they must be displayed next to each other. Placement conforms to this requirement if labels are within 150 mm (5.9 inches) of one another.

(d) Each label must be printed on or affixed to a background of contrasting color, or must have a dotted or solid line outer border.

(e) *Duplicate labeling.* When labeling is required, duplicate labels must be displayed on at least two sides or two ends (other than the bottom) of—

(1) Each non-bulk package or overpack having a volume of 64 cubic feet (1.8 cubic meters) or more;

(2) Each non-bulk package containing a radioactive material;

(3) Each DOT 106 or 110 multi-unit tank car tank. Labels must be displayed on each end;

(4) Each portable tank of less than 1000 gallons (3,785.4 liters) capacity; and

(5) Each freight container or aircraft unit load device having a volume of 64 cubic feet (1.8 cubic meters) or more, but less than 640 cubic feet (18.1 cubic meters). One of each required label must be displayed on or near the closure.

(f) *Obscured labels.* A label must be clearly visible and may not be obscured by markings or attachments.

Section 172.407 would be revised to read as follows:

§ 172.407 Label specifications.

(a) *Durability.* Each label, whether printed on or affixed to a package, must be durable and weather resistant. A label on a package must be able to withstand, without deterioration or a substantial change in color, a 30-day exposure to conditions incident to transportation that reasonably could be expected to be encountered by the labeled package.

(b) *Design.* (1) Except for size and color, the printing, inner border, and symbol on each label must be as shown in §§ 172.411 through 172.448, as appropriate.

(2) The dotted line border shown on each label is not part of the label specification, except when used as an alternative for the solid line outer border to meet the requirements of § 172.406(d).

(c) *Size.* (1) Each diamond (square-on-point) label prescribed in this subpart must be at least 100 mm (3.9 inches) on each side with each side having a solid line inner border 5.0 to 6.3 mm (0.20 to 0.25 inches) from the edge.

(2) The CARGO AIRCRAFT ONLY label must be a rectangle measuring at least 110 mm (4.3 inches) in height by 120 mm (4.7 inches) in width. The word "DANGER" must be shown in letters measuring at least 12.7mm (0.5 inches) in height.

(3) Except as otherwise provided in this subpart, the hazard class number, or division number, as appropriate, must be at least 6.3mm (0.25 inches) and not greater than 12.7 mm (0.5 inches).

(4) When text indicating a hazard is displayed on a label, the label name must be shown in letters measuring at least 7.6mm (0.30 inches) in height except that—

(i) For a SPONTANEOUSLY COMBUSTIBLE or DANGEROUS WHEN WET label, respectively, the words "Spontaneously" and "When Wet" must be shown in letters measuring at least 5.1mm (0.2 inches) in height.

(ii) For a KEEP AWAY FROM FOOD label, the word "HARMFUL" must be shown in letters measuring at least 7.6mm (0.3 inches) in height.

(5) The symbol on each label must be proportionate in size to that shown in the appropriate section of this subpart.

(d) *Color.* (1) The background color on each label must be as prescribed in §§ 172.411 through 172.448, as appropriate.

(2) The symbol, text, numbers, and border must be shown in black on a label except that—

(i) White may be used on a label with a one color background of green, red or blue; and

(ii) White must be used for the text and class number for the CORROSIVE label.

(3) Black and any color on a label must be able to withstand, without substantial change, a 72-hour fadeometer test (for a description of equipment designed for this purpose, see ASTM G 23–69 (1975) or G 26–70).

(4) A color on a label, upon visual examination, must fall within the color tolerances displayed on the appropriate Label and Placard Color Tolerance Chart.

(i) A set of six charts, dated January 1973, for comparison with labels and placards surfaced with paint, lacquer, enamel, plastic or other opaque coatings, or ink, may be purchased from the Office of Hazardous Materials Transportation, U.S. Department of Transportation, Washington, DC 20590, for $5.50.

(ii) A set of six charts, dated January 1974, for comparison with labels and placards surfaced with ink, may be similarly purchased for $12.50.

(iii) Both sets of charts may be inspected in Room 8426, Nassif Building, 400 7th Street, SW. Washington, DC 20590, or any of the offices of the Federal Highway Administration listed at 49 CFR 390.40.

(iv) The technical specifications for each chart are set forth in Appendix A to this part.

(5) The specified label color must extend to the edge of the label in the area designated on each label except the CORROSIVE, RADIOACTIVE YELLOW-II AND RADIOACTIVE YELLOW-III labels on which the color must extend only to the inner border.

(e) *Form identification.* A label may contain form identification information, including the name of its maker, provided that information is printed outside the solid line inner border in no larger than 10-point type.

(f) *Exceptions.* A label conforming to specifications in the UN Recommendations may be used in place of a corresponding label which conforms to the requirements of this subpart.

Section 172.411 would be revised to read as follows:

§ 172.411 EXPLOSIVE 1.1, 1.2, 1.3, 1.4 and 1.5 labels.

(a) Except for size and color, the EXPLOSIVE 1.1, EXPLOSIVE 1.2 and EXPLOSIVE 1.3 labels must be as follows:

(b) In addition to complying with § 172.407, the background color on the EXPLOSIVE 1.1, EXPLOSIVE 1.2 and EXPLOSIVE 1.3 labels must be orange. The "**" shall be replaced with the appropriate division number and compatibility group. The compatibility group letter must be the same size as the division number and must be shown as a capitalized Roman letter.

(c) Except for size and color, the EXPLOSIVE 1.4 and EXPLOSIVE 1.5 labels must be as follows:

EXPLOSIVE 1.4:

EXPLOSIVE 1.5:

(d) In addition to complying with § 172.407, the background color on the EXPLOSIVE 1.4 and EXPLOSIVE 1.5 labels must be orange. The "*" shall be replaced with the appropriate compatibility group. The compatibility group letter must be shown as a capitalized Roman letter measuring at least 12.7mm (0.5 inches) in height. Division numerals must measure at least 30mm (1.2 inches) in height and at least 5mm (0.2 inches) in width.

Section 172.415 would be revised to read as follows:

§ 172.415 NON-FLAMMABLE GAS label.

(a) Except for size and color, the NON-FLAMMABLE GAS label must be as follows:

(b) In addition to complying with § 172.407, the background color on the NON–FLAMMABLE GAS label must be green.

Section 172.416 is revised to read as follows:

§ 172.416 POISON GAS label.

(a) Except for size and color, the POISON GAS label must be as follows:

(b) In addition to complying with § 172.407, the background on the POISON GAS label must be white.

Section 172.417 would be revised to read as follows:

§ 172.417 FLAMMABLE GAS label.

(a) Except for size and color, the FLAMMABLE GAS label must be as follows:

(b) In addition to complying with § 172.407, the background color on the FLAMMABLE GAS label must be red.

Section 172.419 would be revised as follows:

§ 172.419 FLAMMABLE LIQUID label.

(a) Except for size and color the FLAMMABLE LIQUID label must be as follows:

(b) In addition to complying with § 172.407, the background color on the FLAMMABLE LIQUID label must be red.

Section 172.420 would be revised to read as follows:

§ 172.420 FLAMMABLE SOLID label.

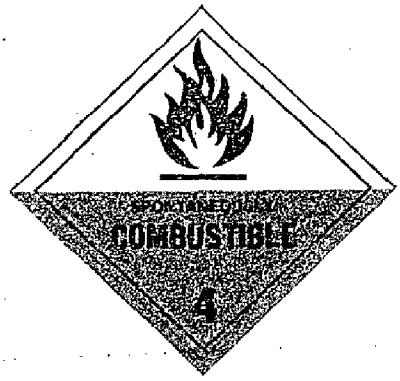
(a) Except for size and color, the FLAMMABLE SOLID label must be as follows:

(b) In addition to complying with § 172.407, the background on the FLAMMABLE SOLID label must be white with vertical red stripes equally spaced on each side of a red stripe placed in the center of the label. The red vertical stripes must be spaced so that, visually, they appear equal in width to the white spaces between them. The symbol (flame) and text (when used) must be overprinted. The text "FLAMMABLE SOLID" may be placed in a white rectangle.

Section 172.422 would be revised to read as follows:

§ 172.422 SPONTANEOUSLY COMBUSTIBLE label.

(a) Except for size and color, the SPONTANEOUSLY COMBUSTIBLE label must be as follows:



(b) In addition to complying with § 172.407, the background color on the lower half of the SPONTANEOUSLY COMBUSTIBLE label must be red and the upper half must be white.

Section 172.423 would be revised to read as follows:

§ 172.423 DANGEROUS WHEN WET label.

(a) Except for size and color, the DANGEROUS WHEN WET label must be as follows:

(b) In addition to complying with § 172.407, the background color on the DANGEROUS WHEN WET label must be blue.

Section 172.426 would be revised as follows:

§ 172.426 OXIDIZER label.

(a) Except for size and color, the OXIDIZER label must be as follows:

(b) In addition to complying with § 172.407, the background color on the OXIDIZER label must be yellow.

Section 172.427 would be revised to read as follows:

§ 172.427 ORGANIC PEROXIDE label.

(a) Except for size and color, the ORGANIC PEROXIDE label must be as follows:

(b) In addition to complying with § 172.407, the background color on the ORGANIC PEROXIDE label must be yellow.

Section 172.430 would be revised as follows:

§ 172.430 POISON label.

(a) Except for size and color, the POISON label must be as follows:

(b) In addition to complying with § 172.407, the background on the POISON label must be white.

A new § 172.431 would be added to read as follows:

§ 172.431 KEEP AWAY FROM FOOD label.

(a) Except for size and color, the KEEP AWAY FROM FOOD label must be as follows:

(b) In addition to complying with § 172.407, the background on the KEEP AWAY FROM FOOD label must be white.

Section 172.432 would be revised to read as follows:

§ 172.432 INFECTIOUS SUBSTANCE label.

(a) Except for size and color, the INFECTIOUS SUBSTANCE label must be as follows:

(b) In addition to complying with § 172.407, the background on the INFECTIOUS SUBSTANCE label must be white.

Section 172.436 would be revised to read as follows:

§ 172.436 RADIOACTIVE WHITE–I label.

(a) Except for size and color, the RADIOACTIVE WHITE–I label must be as follows:

(b) In addition to complying with § 172.407, the background on the RADIOACTIVE WHITE–I label must be white. The printing and symbol must be black, except for the "I" which must be red.

Section 172.438 would be revised to read as follows:

§ 172.438 RADIOACTIVE YELLOW–II label.

(a) Except for size and color, the RADIOACTIVE YELLOW–II must be as follows:

(b) In addition to complying with § 172.407, the background color on the RADIOACTIVE YELLOW–II label must be yellow in the top half and white in the lower half. The printing and symbol must be black, except for the "II" which must be red.

Section 172.440 would be revised to read as follows:

§ 172.440 RADIOACTIVE YELLOW–III label.

(a) Except for size and color, the RADIOACTIVE YELLOW–III label must be as follows:

(b) In addition to complying with § 172.407, the background color on the RADIOACTIVE YELLOW–III label must be yellow in the top half and white in the lower half. The printing and symbol must be black, except for the "III" which must be red.

Section 172.442 would be revised to read as follows:

§ 172.442 CORROSIVE label.

(a) Except for size and color, the CORROSIVE label must be as follows:

(b) In addition to complying with § 172.407, the background on the CORROSIVE label must be white in the top half and black in the lower half.

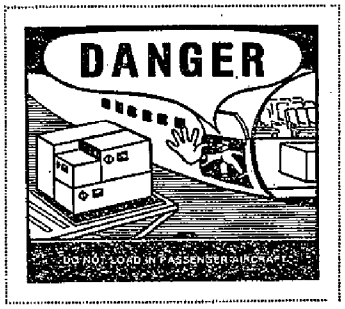
§ 172.444 [Amended]

In § 172.444, paragraphs (b) and (c) would be removed.

Section 172.448 would be revised to read as follows:

§ 172.448 CARGO AIRCRAFT ONLY label.

(a) Except for size and color, the CARGO AIRCRAFT ONLY label must be as follows:



(b) The CARGO AIRCRAFT ONLY label must be black on an orange background.

Subpart F—Placarding

Section 172.500 would be revised to read as follows:

§ 172.500 Applicability of placarding requirements.

(a) Each person who offers for transportation or transports any hazardous material subject to this subchapter shall comply with the applicable placarding requirements of this subpart.

(b) This subpart does not apply to—

(1) Infectious substances;

(2) Hazardous materials classed as ORM–D or E or Class 9;

(3) Hazardous materials authorized by this subchapter to be offered for transportation as Limited Quantities when identified as such on shipping papers in accordance with § 172.203(b);

(4) Hazardous materials which are packaged as small quantities under the provisions of § 173.4 of this subchapter; and

(5) Combustible liquids in non-bulk packagings.

Section 172.502 would be revised to read as follows:

§ 172.502 Prohibited and permissive placarding.

(a) *Prohibited placarding.* Except as provided in paragraph (c) of this section, no person may affix or display on a bulk packaging, freight container, unit load device, motor vehicle or rail car any placard described in this subpart unless—

(1) The material being offered or transported is a hazardous material, and

(2) The placard represents a hazard of the hazardous material being offered or transported.

(b) No person may affix or display any sign or other device on a bulk packaging, freight container, unit load device, motor vehicle or rail car, that by its color, design, shape or content could be confused with any placard prescribed in this subpart.

(c) *Exceptions.* The restrictions in paragraphs (a) and (b) of this section do not apply to a bulk packaging, freight container, unit load device, motor vehicle or rail car which is placarded in conformance with the TDG Regulations, the IMDG Code or the UN Recommendations.

(d) The restrictions of paragraph (b) of this section do not apply to the display of an identification number on a white square-on-point configuration in accordance with § 172.336(b).

(e) *Permissive placarding.* Placards may be displayed for a hazardous material in accordance with this subpart even when not required if—

(1) The material and placards conform to the requirements of paragraph (a) of this section, and

(2) Neither an identification number, hazard class nor division number is displayed on a placard corresponding to a subsidiary hazard of the hazardous material.

Section 172.504 would be revised to read as follows:

§ 172.504 General placarding requirements.

(a) *General.* Except as otherwise provided in this subchapter, each bulk packaging, freight container, unit load device, motor vehicle or rail car containing any quantity of a hazardous material must be placarded on each side and each end with the type of placards specified in Tables 1 and 2 of this section and in accordance with other placarding requirements of this subpart, including the specifications for the placards named in the tables and described in detail in §§ 172.519 through 172.558.

(b) *DANGEROUS placard.* A freight container, unit load device, motor vehicle or rail car which contains non-bulk packagings with two or more categories of hazardous materials that require different placards specified in Table 2 may be placarded with DANGEROUS placards instead of the separate placarding specified for each of the materials in Table 2. However, when 5,000 pounds (2,267.9 Kg) or more of one category of material is loaded therein at one loading facility, the placard specified in Table 2 for that category must be applied.

(c) *Exception for less than 1,000 pounds.* For non-bulk packagings, when the gross weight of all hazardous materials covered by Table 2 is less than 1,000 pounds (453.6 Kg), no placard is required on a freight container, unit load device, motor vehicle, or rail car for the Table 2 materials. This paragraph does not apply to transportation by aircraft or vessel, or to transport vehicles, freight containers and unit load devices subject to § 172.505.

(d) *Exception for empty non-bulk packages.* A non-bulk packaging that contains only the residue of a hazardous material covered by Table 2 of paragraph (e) of this section need not be included in determining placarding requirements.

(e) *Placarding tables.* Placards are specified for hazardous materials in accordance with the following tables:

TABLE 1

Category of material (Hazard class or division number and additional description, as appropriate)	Placard name	Placard design section reference (§)
1.1	EXPLOSIVES 1.1	172.522
1.2	EXPLOSIVES 1.2	172.522
2.3 (poisonous gas)	POISON GAS	172.540
4.3	DANGEROUS WHEN WET.	172.548
6.1 (PG I inhalation hazard only).	POISON	172.554
7 (Radioactive Yellow III label only).	RADIOACTIVE	172.556

TABLE 2

Category of material (Hazard class or division number and additional description, as appropriate)	Placard name	Placard design section reference (§)
1.3	EXPLOSIVES 1.3	172.522
1.4	EXPLOSIVES 1.4	172.523
1.5	EXPLOSIVES 1.5	172.524
2.1 (flammable gas)	FLAMMABLE GAS	172.532
2.2 (nonflammable gas)	NON-FLAMMABLE GAS.	172.528
3 (flammable liquid)	FLAMMABLE	172.542
3 (combustible liquid)	COMBUSTIBLE	172.544
4.1	FLAMMABLE SOLID	172.546
4.2	SPONTANEOUSLY COMBUSTIBLE.	172.547
5.1	OXIDIZER	172.550
5.2	ORGANIC PEROXIDE	172.552
6.1 (PG I or II, other than PG I inhalation hazard).	POISON	172.554
6.1 (PG III)	KEEP AWAY FROM FOOD.	172.553
6.2	(none)	
7 (Radioactive White-I or Yellow-II label).	(none)	
7 (Radioactive Yellow-III label).	RADIOACTIVE	172.556
8	CORROSIVE	172.558
9	(none)	
ORM-D	(none)	
ORM-E	(none)	

(f) *Additional placarding exceptions.*

(1) An EXPLOSIVES 1.2 placard is not required for Division 1.2 explosives on a motor vehicle, rail car, freight container or unit load device which contains Division 1.1 explosives, and is placarded with EXPLOSIVES 1.1 placards, as required.

(2) A FLAMMABLE placard may be used in place of a COMBUSTIBLE placard on a cargo tank, a portable tank or a compartmented tank car which contains both flammable and combustible liquids.

(3) A NON-FLAMMABLE GAS placard is not required on a motor vehicle which contains non-flammable gas if the motor vehicle also contains flammable gas and it is placarded with FLAMMABLE GAS placards, as required.

(4) An EXPLOSIVES 1.4, 1.5 or OXIDIZER placard is not required for Division 1.4, 1.5 or 5.1 materials on a freight container, unit load device, motor vehicle or rail car which also contains Division 1.1 or 1.2 explosives and is placarded with EXPLOSIVES 1.1 or 1.2 placards, as required.

(5) For transportation by motor vehicle or rail car only, an OXIDIZER placard is not required for Division 5.1 materials on a motor vehicle, rail car or freight container which also contains Division 1.5 explosives and is placarded with EXPLOSIVES 1.5 placards, as required.

Section 172.505 would be revised to read as follows:

§ 172.505 Multiple placarding.

(a) Each transport vehicle, portable tank, freight container or unit load device that contains a poisonous material subject to the "Poison-Inhalation Hazard" shipping description of § 172.203(k)(4) shall be placarded with POISON or POISON GAS placards, as appropriate, on each side and each end, in addition to the placards required by § 172.504. This requirement does not apply to non-bulk packages having primary receptacles of one liter (1.06 quarts) or less. Duplication of the POISON or POISON GAS placard is not required.

(b) Each transport vehicle, portable tank or freight container that contains 1000 pounds (453.6 kg) or more gross weight of fissile or low specific activity uranium hexafluoride shall be placarded with RADIOACTIVE and CORROSIVE placards on each side and each end.

(c) Each transport vehicle, portable tank, freight container or unit load device that contains a material which has a subsidiary hazard of being dangerous when wet, as defined in § 173.124, shall be placarded with DANGEROUS WHEN WET placards, on each side and each end, in addition to the placards required by § 172.504.

§ 172.508 [Amended]

In paragraph (a) of § 172.508, the phrase "§§ 172.502 and 172.504 as these sections pertain to placarding the rail car" would be revised to read "this subpart."

In § 172.510 paragraph (b) would be removed and reserved, and paragraph (a) would be revised to read as follows:

§ 172.510 Special placarding provisions: Rail.

(a) *Square background required.* Each EXPLOSIVES 1.1, EXPLOSIVES 1.2, POISON GAS and POISON GAS—RESIDUE placard affixed to a rail car must be placed on a square background as described in § 172.527.

(b) [Reserved]

* * * * *

§ 172.512 [Amended]

In § 172.512 the following changes would be made:

1. In paragraph (a)(1), the section reference "§ 172.504(c)(1)" would be revised to read "§ 172.504(c)".

2. In paragraph (a)(2), the phrase "paragraphs (c)(1) and (c)(2)" would be revised to read "paragraph (c)".

3. In paragraphs (b)(1) and (b)(2), the section references "§ 172.406(e)(3)" and "§ 172.406(e)", respectively, would be revised to read "Subpart E of this part, including § 172.406(e)."

Section 172.514 would be revised to read as follows:

§ 172.514 Bulk packagings other than tank cars.

(a) Each person who offers for transportation a bulk packaging, other than a tank car, which contains a hazardous material shall affix the placards specified for the material in §§ 172.504 and 172.505. However, a portable tank having a capacity of less than 1,000 gallons (3,785.4 liters)—

(1) May be placarded on only two opposite sides; or

(2) May be labeled instead of placarded, in accordance with Subpart E of this part.

(b) Each bulk packaging, other than a tank car, that is required to be placarded when it contains a hazardous material, must remain placarded when it is emptied, unless it is—

(1) Sufficiently cleaned of residue and purged of vapors to remove any potential hazard; or

(2) Refilled, with a material requiring different placards or no placards, to such an extent that any residue remaining in the packaging is no longer hazardous.

In § 172.516, the introductory text of paragraph (c) would be revised and paragraph (c)(7) would be added to read as follows:

§ 172.516 Visibility and display of placards.

* * * * *

(c) Each placard on a transport vehicle, bulk packaging, freight container or aircraft unit load device must—

* * * * *

(7) Be affixed to a background of contrasting color, or must have a dotted or solid line outer border which contrasts with the background color.

* * * * *

Section 172.519 would be revised to read as follows:

§ 172.519 General specifications for placards.

(a) *Strength and durability.* Placards must conform to the following:

(1) A placard may be made of any plastic, metal or other material capable of withstanding, without deterioration or a substantial reduction in effectiveness, a 30-day exposure to open weather conditions.

(2) Each placard must be able to pass a 60 p.s.i. Mullen test.

(3) A placard made of tagboard must be at least equal to that designated commercially as white tagboard. Tagboard must have a weight of at least 200 pounds (90.7 kg) per ream of 24 by 36-inch (61.0 by 91.4 cm) sheets.

(4) Reflective or retroreflective materials may be used on a placard if the prescribed colors, strength and durability are maintained.

(b) *Design.* (1) Except as provided in § 172.332, each placard must be as described in this subpart, and except for size and color, the printing, inner border and symbol must be as shown in §§ 172.521 through 172.558, as appropriate.

(2) The dotted line border shown on each placard is not part of the placard specification. However, a dotted or solid line outer border may be used when needed to indicate the full size of a placard that is part of a larger format or is on a background of a non-contrasting color.

(3) For Classes 2, 3, 4, 5, 6 or 8, text indicating a hazard (for example, "FLAMMABLE") is not required.

(4) For a placard corresponding to the primary hazard class of a material, the hazard class or division number must be displayed in the lower corner of the placard. However, no hazard class or division number may be displayed on a placard corresponding to a subsidiary hazard of the material.

(c) *Size.* (1) Each placard prescribed in this subpart must measure 273mm (10.75 inches) on each side and must have a solid line inner border 12.7mm (0.5 inches) from each edge.

(2) Except as otherwise provided in this subpart, the hazard class or division number, as appropriate, must be shown in numerals measuring at least 41.0mm (1.62 inches) in height.

(3) Except as otherwise provided in this subpart, when text indicating a hazard is displayed on a placard, the printing must be in letters measuring at least 45.0mm (1.77 inches) in height.

(d) *Color.* (1) The background color, symbol, text, numerals and inner border on a placard must be as specified in §§ 172.521 through 172.558, as appropriate.

(2) Black and any color on a placard must be able to withstand, without substantial change—

(i) A 72-hour fadeometer test (for a description of equipment designed for this purpose, see ASTM G 23–69 (1975) or ASTM G 26–70); and

(ii) A 30-day exposure to open weather.

(3) Upon visual examination, a color on a placard must fall within the color tolerances displayed on the appropriate Office of Hazardous Materials Label and Placard Color Tolerance Chart (see § 172.407(d)(4)).

(4) The placard color must extend to the inner border and may extend to the edge of the placard in the area designated on each placard except the color on the CORROSIVE and RADIOACTIVE placards (black and yellow, respectively) must extend only to the inner border.

(e) *Form identification.* A placard may contain form identification information, including the name of its maker, provided that information is printed outside of the solid line inner border in no larger than 10-point type.

(f) *Exceptions.* A placard conforming to specifications in the UN Recommendations or the TDG Regulations may be used in place of a corresponding placard which conforms to the requirements of this subpart.

Section 172.522 would be revised to read as follows:

§ 172.522 EXPLOSIVES 1.1, EXPLOSIVES 1.2 and EXPLOSIVES 1.3 placards.

(a) Except for size and color, the EXPLOSIVES 1.1, EXPLOSIVES 1.2 and EXPLOSIVES 1.3 placards must be as follows:

(b) In addition to complying with § 172.519, the background color on the EXPLOSIVES 1.1, EXPLOSIVES 1.2 and EXPLOSIVES 1.3 placards must be orange. The "*" shall be replaced with the appropriate division number. The symbol, text, numerals and inner border must be black.

Section 172.523 would be revised to read as follows:

§ 172.523 EXPLOSIVES 1.4 placard.

(a) Except for size and color, the EXPLOSIVES 1.4 placard must be as follows:

(b) In addition to complying with § 172.519, the background color on the EXPLOSIVES 1.4 placard must be orange. The division numeral, 1.4, must measure at least 63.5mm (2.5 inches) in height. The text, numerals and inner border must be black.

Section 172.524 would be revised to read as follows:

§ 172.524 EXPLOSIVES 1.5 placard.

(a) Except for size and color, the EXPLOSIVES 1.5 placard must be as follows:

(b) In addition to complying with § 172.519, the background color on the EXPLOSIVES 1.5 placard must be orange. The division numeral, 1.5, must measure at least 63.5mm (2.5 inches) in height. The text, numerals and inner border must be black.

Section 172.528 would be revised to read as follows:

§ 172.528 NON-FLAMMABLE GAS placard.

(a) Except for size and color, the NON-FLAMMABLE GAS placard must be as follows:

(b) In addition to complying with § 172.519, the background color on the NON–FLAMMABLE GAS placard must be green. The letters in both words must be at least 38.1mm (1.5 inches) high. The symbol, text, class number and inner border must be white.

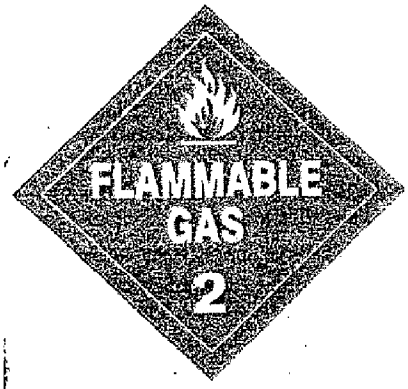
§ 172.530 [Removed]

Section 172.530 would be removed.

Section 172.532 would be revised to read as follows:

§ 172.532 FLAMMABLE GAS placard.

(a) Except for size and color, the FLAMMABLE GAS placard must be as follows:



(b) In addition to complying with § 172.519, the background color on the FLAMMABLE GAS placard must be red. The symbol, text, class number and inner border must be white.

§ 172.536 [Removed]

Section 172.536 would be removed.

Section 172.540 would be revised to read as follows:

§ 172.540 POISON GAS placard.

(a) Except for size and color, the POISON GAS placard must be as follows:

(b) In addition to complying with § 172.519, the background color on the POISON GAS placard must be white. The symbol, text, class number and inner border must be black.

Section 172.542 would be revised to read as follows:

§ 172.542 FLAMMABLE placard.

(a) Except for size and color, the FLAMMABLE placard must be as follows:

(b) In addition to complying with § 172.519, the background color on the FLAMMABLE placard must be red. The symbol, text, class number and inner border must be white.

(c) The word "GASOLINE" may be used in place of the word "FLAMMABLE" on a placard that is displayed on a cargo tank or a portable tank being used to transport gasoline by highway. The word "GASOLINE" must be shown in white.

Section 172.544 would be revised to read as follows:

§ 172.544 COMBUSTIBLE placard.

(a) Except for size and color, the COMBUSTIBLE placard must be as follows:

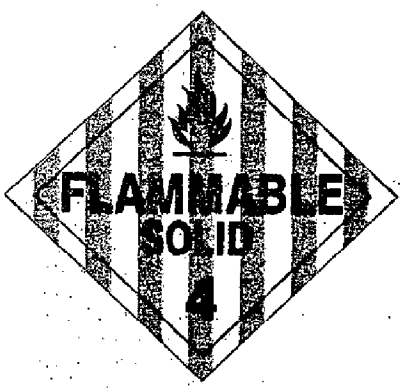
(b) In addition to complying with § 172.519, the background color on the COMBUSTIBLE placard must be red. The symbol, text, class number and inner border must be white. On a COMBUSTIBLE placard with a white bottom as prescribed by § 172.332(c)(4), the class number must be red or black.

(c) The words "FUEL OIL" may be used in place of the word "COMBUSTIBLE" on a placard that is displayed on a cargo tank or portable tank being used to transport by highway fuel oil that is not classed as a flammable liquid. The words "FUEL OIL" must be shown in white.

Section 172.546 would be revised to read as follows:

§ 172.546 FLAMMABLE SOLID placard.

(a) Except for size and color, the FLAMMABLE SOLID placard must be as follows:



(b) In addition to complying with § 172.519, the background on the FLAMMABLE SOLID placard must be white with seven vertical red stripes. The stripes must be equally spaced, with one red stripe placed in the center of the label. Each red stripe and each white space between two red stripes must be 25.4mm (1.0 inches) wide. The letters in the word "SOLID" must be at least 38.1mm (1.5 inches) high. The symbol, text, class number and inner border must be black.

A new § 172.547 would be added to read as follows:

§ 172.547 SPONTANEOUSLY COMBUSTIBLE placard.

(a) Except for size and color, the SPONTANEOUSLY COMBUSTIBLE placard must be as follows:

(b) In addition to complying with § 172.519, the background color on the SPONTANEOUSLY COMBUSTIBLE placard must be red in the lower half and white in upper half. The letters in the word "SPONTANEOUSLY" must be at least 33mm (1.3 inches) high. The symbol, text, class number and inner border must be black.

Section 172.548 would be revised to read as follows:

§ 172.548 DANGEROUS WHEN WET placard.

(a) Except for size and color, the DANGEROUS WHEN WET placard must be as follows:

(b) In addition to complying with § 172.519, the background color on the DANGEROUS WHEN WET placard must be blue. The letters in the words "WHEN WET" must be at least 25.4mm (1.0 inches) high. The symbol, text, class number and inner border must be white.

Section 172.550 would be revised to read as follows:

§ 172.550 OXIDIZER placard.

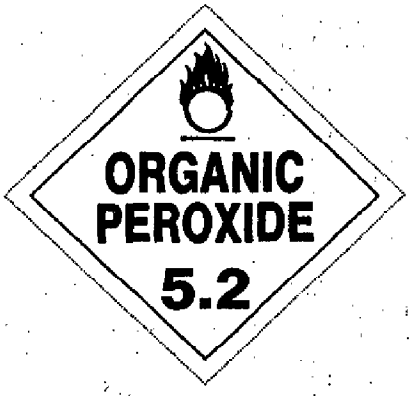
(a) Except for size and color, the OXIDIZER placard must be as follows:

(b) In addition to complying with § 172.519, the background color on the OXIDIZER placard must be yellow. The symbol, text, division number and inner border must be black.

Section 172.552 would be revised to read as follows:

§ 172.552 ORGANIC PEROXIDE placard.

(a) Except for size and color, the ORGANIC PEROXIDE placard must be as follows:



(b) In addition to complying with § 172.519, the background color on the ORGANIC PEROXIDE placard must be yellow. The symbol, text, division number and inner border must be black.

A new § 172.553 would be added to read as follows:

§ 172.553 KEEP AWAY FROM FOOD placard.

(a) Except for size and color, the KEEP AWAY FROM FOOD placard must be as follows:

(b) In addition to complying with § 172.519, the background on the KEEP AWAY FROM FOOD placard must be white. The size of the lettering below the word "HARMFUL" must be proportional to that shown. The symbol, text, class number and inner border must be black.

Section 172.554 would be revised to read as follows:

§ 172.554 POISON placard.

(a) Except for size and color, the POISON placard must be as follows:

(b) In addition to complying with § 172.519, the background on the POISON placard must be white. The symbol, text, class number and inner border must be black.

Section 172.556 would be revised to read as follows:

§ 172.556 RADIOACTIVE placard.

(a) Except for size and color, the RADIOACTIVE placard must be as follows:

(b) In addition to complying with § 172.519, the background color on the RADIOACTIVE placard must be white in the lower portion with a yellow triangle in the upper portion. The base of the yellow triangle must be 28.6mm ±5mm (1.13 inches ±0.20 inches) above the placard horizontal center line. The symbol, text, class number and inner border must be black.

Section 172.558 would be revised to read as follows:

§ 172.558 CORROSIVE placard.

(a) Except for size and color, the CORROSIVE placard must be as follows:

(b) In addition to complying with § 172.519, the background color on the CORROSIVE placard must be black in the lower portion with a white triangle in the upper portion. The base of the white triangle must be 38.1 mm±5 mm (1.5 inches) above the placard horizontal center line. The text and class number must be white. The symbol and inner border must be black.

Appendix B—[Reserved]

Appendix B to Part 172 would be removed and reserved.

PART 173—SHIPPERS—GENERAL REQUIREMENTS FOR SHIPMENTS AND PACKAGINGS

The authority citation for Part 173 would continue to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1806, 1807, 1808; 49 CFR Part 1, unless otherwise noted.

With the exception of Subparts C and I, the table of contents for Part 173 would be revised as follows:

Subpart A—General

Subpart B—Preparation of Hazardous Materials for Transportation

* * * * *

Subpart D—Definitions, Classification, Packing Group Assignments and Exceptions for Hazardous Materials Other Than Class 1 and Class 7

Subpart E—Non-bulk Packaging for Hazardous Materials Other Than Class 1 and Class 7

Subpart A—General

In § 173.1, paragraph (d) would be added as follows:

§ 173.1 Purpose and scope.

* * * * *

(d) In general, the Hazardous Materials Regulations (HMR) contained in this subchapter are based on the Recommendations of the United Nations Committee of Experts on the Transport of Dangerous Goods and are consistent with international regulations issued by the International Civil Aviation Organization and the International Maritime Organization. However, the HMR are not consistent in all respects with the UN Recommendations, the ICAO Technical Instructions or the IMDG Code, and compliance with the HMR will not guarantee acceptance by regulatory bodies outside of the United States.

Section 173.2 would be revised as follows:

§ 173.2 Hazardous materials classes and index to hazard class definitions.

The hazard class of a hazardous material is indicated either by its class (or division) number, its class name, or by the letters "ORM–D" or "ORM–E". The following table lists class numbers, division numbers, class or division names and those sections of this subchapter which contain definitions for classifying hazardous materials, including forbidden materials.

Class No.	Division No. (if any)	Name of class or division	49 CFR reference for definitions
None		Forbidden materials	173.21
None		Forbidden explosives	173.53
1	1.1	Explosives (with a mass explosion hazard)	173.50
1	1.2	Explosives (with a projection hazard)	173.50
1	1.3	Explosives (with predominately a fire hazard)	173.50
1	1.4	Explosives (with no significant blast hazard)	173.50
1	1.5	Very insensitive explosives; blasting agents	173.50
2	2.1	Flammable gas	173.115
2	2.2	Non-flammable compressed gas	173.115
2	2.3	Poisonous gas	173.115
3		Flammable and combustible liquids	173.120
4	4.1	Flammable solids	173.124
4	4.2	Spontaneously combustible materials	173.124
4	4.3	Dangerous when wet materials	173.124
5	5.1	Oxidizers	173.128
5	5.2	Organic peroxides	173.128
6	6.1	Poisonous materials	173.132
6	6.1	Irritating materials	173.381

Class No.	Division No. (if any)	Name of class or division	49 CFR reference for definitions
6	6.2	Etiologic or infectious substances	173.134
7		Radioactive materials	173.403
8		Corrosive materials	173.136
9		Miscellaneous hazardous materials	173.140
None		Other regulated materials: ORM-D and ORM-E	173.144

Section 173.2a would be added to read as follows:

§ 173.2a Classification of a material having more than one hazard.

(a) *Materials not subject to precedence of hazard ranking.* (1) A material with more than one hazard which is specifically identified and classed in the § 172.101 Table is not subject to the precedence of hazard ranking of this section, (unless that material does not pose the hazard of the class assigned in the § 172.101 Table, and is not preceded, in Column 1 of the Table, with a "+" symbol.)

(2) *Class 1.* An explosive shall be classed and approved in accordance with Subpart C of this part.

(3) *Division 5.2.* A material meeting the definition in § 173.128 for organic peroxide shall be classed in Division 5.2.

(4) *Division 6.2.* A material meeting the definition in § 173.134 for etiologic agent shall be classed in Division 6.2.

(5) *Class 7-limited quantities.* A limited quantity radioactive material that meets the definitions for more than one hazard class shall be classed in accordance with § 173.421-2.

(b) *Precedence of hazard.* Except as otherwise provided in this section, a material meeting the definitions for more than one hazard class as defined in this part shall be classed according to the highest applicable hazard class of the following hazard classes, which are listed in descending order of hazard:

(1) Class 7 (radioactive materials, except limited quantities).

(2) Division 2.3 (poisonous gases).

(3) Division 2.1 (flammable gases).

(4) Division 2.2 (nonflammable gases).

(5) Class 3 (flammable liquids and combustible liquids) or 8 (corrosive materials) or Division 4.1 (flammable solids), 4.2 (spontaneously combustible materials), 4.3 (dangerous when wet materials), 5.1 (oxidizers) or 6.1 (poisonous liquids or solids). Materials meeting more than one of these hazards shall be assigned a hazard class in accordance with paragraph (c) of this section.

(6) Class 9 (miscellaneous hazardous materials).

(7) ORM-E (hazardous wastes and hazardous substances).

(c) *Precedence of hazard table.* A material meeting the definitions for more than one hazard class for Classes 3 and 8 and Divisions 4.1, 4.2, 4.3, 5.1 and 6.1 shall be assigned a hazard class based on the following table:

PRECEDENCE OF HAZARD TABLE

[Hazard class and packing group]

Hazard Class and packing group	4.2*	4.3*	5.1* I	5.1* II	5.1* III	6.1 I(i)	6.1 I(d)	6.1 I(o)	6.1 II	6.1 III	8 I(l)	8 I(s)	8 II(l)	8 II(s)	8 III(l)	8 III (s)
3 I			3	3	3	6.1	3	3	3	3	8	(1)	3	(1)	3	(1)
3 II			3	3	3	6.1	3	3	3	3	8	(1)	3	(1)	3	(1)
3 III			3	3	3	6.1	6.1	6.1	6.1	3	8	(1)	8	(1)	3	(1)
4.1 I*	4.2	4.3	4.1	4.1	4.1	6.1	6.1	4.1	4.1	4.1	(1)	4.1	(1)	4.1	(1)	4.1
4.1 II*	4.2	4.3	4.1	4.1	4.1	6.1	6.1	6.1	4.1	4.1	(1)	4.1	(1)	4.1	(1)	4.1
4.1 III*	4.2	4.3	4.1	4.1	4.1	6.1	6.1	6.1	6.1	4.1	(1)	8	(1)	8	(1)	4.1
4.2 I*		4.2	4.2	4.2	4.2	6.1	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
4.2 II*		4.2	4.2	4.2	4.2	6.1	6.1	4.2	4.2	4.2	4.2	8	4.2	4.2	4.2	4.2
4.2 III*		4.3	5.1	5.1	4.2	6.1	6.1	6.1	6.1	4.2	8	8	8	8	4.2	4.2
4.3 I*			5.1	4.3	4.3	6.1	6.1	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
4.3 II*			5.1	4.3	4.3	6.1	6.1	4.3	4.3	4.3	8	8	4.3	4.3	4.3	4.3
4.3 III*			5.1	5.1	4.3	6.1	6.1	6.1	6.1	4.3	8	8	8	8	4.3	4.3
5.1 I*						6.1	6.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1	5.1
5.1 II*						6.1	6.1	5.1	5.1	5.1	8	8	5.1	5.1	5.1	5.1
5.1 III*						6.1	6.1	6.1	6.1	5.1	8	8	8	8	5.1	5.1
6.1 I(i)											6.1	6.1	6.1	6.1	6.1	6.1
6.1 I(d)											8	6.1	6.1	6.1	6.1	6.1
6.1 I(o)											8	6.1	6.1	6.1	6.1	6.1
6.1 II(i)											8	6.1	6.1	6.1	6.1	6.1
6.1 II(d)											8	6.1	8	6.1	6.1	6.1
6.1 II(o)											8	8	8	6.1	6.1	6.1
6.1 III											8	8	8	8	8	8

(i) Inhalation Toxicity.
(d) Dermal Toxicity.
(o) Oral Toxicity.
(l) Liquid.
(s) Solid.

*There are no established criteria for determining packing groups within Divisions 4.1, 4.2, 4.3 and 5.1. Degree of hazard for these materials should be assessed by analogy with similar materials identified in the § 172.101 Table, allocating the materials to Packing Group I (high hazard), Packing Group II (medium hazard) or Packing Group III (low hazard).

[1] An impossible combination.

Section 173.3 would be revised to read as follows:

§ 173.3 Packaging and exceptions.

(a) The packaging of hazardous materials for transportation by air, highway, rail, or water must be as specified in this part. Methods of manufacture, packing, and storage of hazardous materials, that affect safety in transportation, must be open to inspection by a duly authorized representative of the initial carrier or of the Department. Methods of manufacture and related functions necessary for completion of a DOT specification or UN standard packaging must be open to inspection by a representative of the Department.

(b) The regulations setting forth packaging requirements for a specific material apply to all modes of transportation unless otherwise stated, or unless exceptions from packaging requirements are authorized.

(c) *Salvage drums.* Packages of hazardous materials that are damaged or found leaking and hazardous materials that have spilled or leaked may be placed in a metal or plastic removable head salvage drum that is compatible with the lading and shipped for repackaging or disposal under the following conditions:

(1) The drum must be a UN 1A2, 1B2, 1N2 or 1H2 drum marked for the performance standard commensurate with the packing group of the material it is to contain. Maximum capacity of the drum may not exceed 450 liters (118.88 gallons).

(2) Each drum shall be provided when necessary with sufficient cushioning and absorption material to prevent excessive movement of the damaged package and to absorb all free liquid. All cushioning and absorbent material used in the drum must be compatible with the hazardous material.

(3) Each drum shall be marked with the proper shipping name of the material inside the defective packaging and the name and address of the consignee. In addition, the drum shall be marked "Salvage Drum".

(4) Each drum shall be labeled as prescribed for the respective material.

(5) The shipper shall prepare shipping papers in accordance with Subpart C of Part 172 of this subchapter.

(6) The overpack requirement of § 173.25 does not apply to drums used in accordance with this paragraph.

Section 173.3a would be revised to read as follows:

§ 173.3a Poisonous liquids which are toxic by inhalation.

Notwithstanding the requirements of Part 172 and Part 173 of this subchapter, any hazardous material that meets the definition of Class 6, Division 6.1, Packing Group I, for inhalation toxicity (See §§ 173.132 and 173.133) shall be packaged in non-bulk packagings in accordance with § 173.226 or § 173.227, as appropriate, or in bulk packagings in accordance with § 173.244 and shall be described on shipping papers, marked, labeled, and placarded in accordance with §§ 172.203(k)(4), 172.313(a), 172.402(a)(5) and 172.505(a), of this subchapter respectively.

Section 173.4 would be revised to read as follows:

§ 173.4 Exceptions for small quantities.

(a) Small quantities of Class 3, Division 4.1, Division 5.1, Division 5.2, Class 8, and Division 6.1 materials, and Class 7 materials that also meet the definition of one or more of these hazard classes, are not subject to any other requirements of this subchapter if:

(1) The maximum quantity of material per inner receptacle is limited to:

(i) Thirty (30) milliliters for authorized liquids, other than Division 6.1, Packing Group I, materials;

(ii) Thirty (30) grams for authorized solids, other than Division 6.1, Packing Group I, materials;

(iii) One (1) gram for authorized materials classed as Division 6.1, Packing Group I; and

(iv) An activity level not exceeding that specified in §§ 173.421, 173.422 or 173.424, as appropriate, for a package containing a Class 7 material.

(2) With the exception of temperature sensing devices, each inner receptacle:

(i) Is not liquid-full at 55 °C (131 °F), and

(ii) Is constructed of plastic having a minimum thickness of no less than 0.008-inch (0.2 millimeters), or earthenware, glass, or metal;

(3) Each inner receptacle with a removable closure has its closure held securely in place with wire, tape, or other positive means;

(4) Unless equivalent cushioning and absorbent material surrounds the inside packaging, each inner receptacle is securely packed in an inside packaging with cushioning and absorbent material that:

(i) Will not react chemically with the material, and

(ii) Is capable of absorbing the entire contents (if a liquid) of the receptacle;

(5) The inside packaging is securely packed in a strong outside packaging;

(6) The completed package, as demonstrated by prototype testing, is capable of sustaining—

(i) Each of the following free drops made from a height of 1.8 meters (5.91 feet) directly onto a solid unyielding surface without breakage or leakage from any inner receptacle and without a substantial reduction in the effectiveness of the package:

(A) One drop flat on bottom;

(B) One drop flat on top;

(C) One drop flat on the long side;

(D) One drop flat on the short side; and

(E) One drop on a corner at the junction of three intersecting edges; and

(ii) A compressive load in pounds, determined by multiplying by two the maximum horizontal cross section of the package (in square inches) in the position in which it would normally be transported, without a substantial reduction in effectiveness; the load shall be applied continuously during a period of 24 hours, uniformly against the top and bottom of the package which is in the position in which it is intended to be normally transported.

Note.—Each of the above tests may be performed on a different, but identical, package; i.e., all tests need not be performed on the same package.

(7) Placement of the material in the package or packing different materials in the package does not result in a violation of § 173.21;

(8) The gross weight of the completed package does not exceed 65 pounds (29.5 kg);

(9) The shipper certifies conformance with this section by marking the outside of the package with the statement: "This package conforms to conditions and limitations specified in 49 CFR 173.4";

(10) The package is not opened or otherwise altered until it is no longer in commerce; and

(11) The package, unless specifically approved by the Director, OHMT, does not contain a material assigned any of the following identification numbers associated with the hazardous materials description in the § 172.101 Table:

1092, 1131, 1259, 1380, 1397, 1419, 1422, 1432, 1433, 1491, 1504, 1749, 1798, 1831, 1873, 2031, 2032, 2495, 2626, 2813, 2845, 2924, 2925, 9191, 9193

(b) A package containing a Class 7 material also must conform with the requirements of § 173.421 (a) through (e), or § 173.422 (a) through (f), as appropriate. After May 2, 1987, a package containing a Class 7 material may not be offered for transportation

aboard a passenger-carrying aircraft unless that material is intended for use in, or incident to, research, medical diagnosis or treatment.

§ 173.5 [Amended]

In § 173.5, quantity references would be revised as follows:

a. In paragraph (a)(2), the reference to "1 gallon" would be changed to "4 liters (4.2 quarts)" and the reference to "25 pounds" would be changed to "15 kg (33.1 pounds)".

b. In paragraph (a)(3) the reference to "100 pounds" would be changed to "50 kg (110.2 pounds)."

c. In paragraph (b) the reference to "55 gallons" would be changed to "220 L (58.1 gallons)".

§ 173.6 [Removed]

Section 173.6 would be removed.

§ 173.7 [Amended]

In § 173.7, in paragraphs (b) and (d), the word "radioactive" would be changed to "Class 7".

Section 173.9 would be revised as follows:

§ 173.9 Cars, truck bodies or trailers containing lading which has been fumigated or treated with Class 3, Divisions 2.1, 2.3, or 6.1 materials.

(a) Delivery for transportation by rail carrier of any rail car, freight container, truck body, or trailer containing lading which has been fumigated or treated with Class 3 or Division 2.1 materials is prohibited until 48 hours have elapsed after such fumigation or treatment, or until the rail car, freight container, truck body or trailer has been ventilated so as to remove any danger of fire or explosion due to the presence of flammable vapors.

(b) Any rail car, freight container, truck body or trailer containing lading which has been fumigated or treated with Division 6.1 or Division 2.3 materials, such as carbolic acid, liquid or solid, chlorpicrin, hydrocyanic acid, methyl bromide, etc., must be placarded on each door or near thereto with the FUMIGANT placard prescribed in paragraph (c) of this section.

(c) *FUMIGANT placard.* The FUMIGANT placard must consist of red letters on a white background which is at least 25 cm (9.8 inches) wide and 20 cm (7.9 inches) high. It must contain the name of the fumigant and other text as follows:

DANGER

The lading of this car has been FUMIGATED or TREATED with

(Name of poisonous liquid, solid, or gas)

BEFORE UNLOADING, open both doors and DO NOT ENTER until car is free of gas. REMOVE ALL POISONOUS MATERIAL before release of empty car.

(d) See § 174.615 of this subchapter for requirements for cleaning fumigated cars.

§ 173.10 [Amended]

In § 173.10, terms would be revised as follows:

1. In paragraph (a) the term "flammable gas" would be changed to "Division 2.1 material" and the term "flammable liquid" would be changed to "Class 3 material".

2. In paragraph (b) the term "compressed gas" would be changed to "Class 2 material".

3. In paragraph (e), the phrase "Flammable liquids and flammable gases" would be changed to "Class 3 and Division 2.1 materials."

Section 173.12 would be revised to read as follows:

§ 173.12 Exceptions for shipment of waste materials.

(a) *Open head drums.* If a hazardous material that is a hazardous waste is required by this subchapter to be shipped in a closed head drum (i.e., a drum with a 7.0 cm (2.75 inches) or less bung opening) and the hazardous waste contains solids or semisolids that make its placement in a closed head drum impracticable, an equivalent (except for closure) open head drum maybe used for the hazardous waste.

(b) *"Lab packs".* Waste materials classed as Class or Division 3, 4.1, 4.2, 4.3, 5.1, 6.1, 8, 9 or ORM–E are excepted from the specification packaging requirements of this subchapter if packaged in combination packagings in accordance with this paragraph and transported for disposal or recovery by private or contract motor carrier by highway only. In addition, a generic description from the § 172.101 Table may be used in place of specific chemical names, when two or more chemically compatible waste materials in the same hazard class are packaged in the same outside packaging. Additional packaging requirements are as follows:

(1) The outer packaging must be a 1A2 or 1B2 metal drum, a 1D plywood drum, a 1G fiber drum or a 1H2 plastic drum;

(2) The inner packagings must be either glass not exceeding 4 liters (4.2 quarts) rated capacity or metal or plastic not exceeding 20 liters (21.1 quarts) rated capacity;

(3) Each outer packaging may contain only one class of hazardous material;

(4) Inner packagings containing liquid must be surrounded by a chemically compatible absorbent material in sufficient quantity to absorb the total liquid contents;

(5) Gross weight of the complete package may not exceed 205 kg (451.9 lbs); and

(6) Materials meeting the definition of Division 6.1, Packing Group I, or Division 4.2, Packing Group I, may not be packaged or described under the provisions of this paragraph.

(c) *Nonreusable packagings.* A packaging which is nonreusable according to the specification requirements of Part 178 of this subchapter or to § 173.28 of this part may be reused for the shipment of hazardous waste to designated facilities subject to the following conditions:

(1) Except as authorized by this paragraph, the waste must be packaged in accordance with this part and offered for transportation in accordance with the requirements of this subchapter.

(2) Transportation is performed by highway only.

(3) A package is not offered for transportation less than 24 hours after it is finally closed for transportation, and each package is inspected for leakage and is found to be free from leaks immediately prior to being offered for transportation.

(4) Each package is loaded by the shipper and unloaded by the consignee, unless the motor carrier is a private or contract carrier.

(5) The packaging may be used only once under this paragraph and may not be used again for shipment of hazardous materials except in accordance with § 173.28.

Subpart B—Preparation of Hazardous Materials for Transportation

Section 173.21 would be revised as follows:

§ 173.21 Forbidden materials and packages.

Unless otherwise provided in this subchapter, the offering for transportation or transportation of the following is forbidden:

(a) Materials that are designated "Forbidden" in Column 3 of the § 172.101 Table.

(b) Forbidden explosives as defined in § 173.51 of this part.

(c) Electrical devices which are likely to create sparks or generate a dangerous quantity of heat, unless packaged in a manner which precludes such an occurrence.

(d) For carriage by aircraft, any package which has a magnetic field of more than 0.00525 gauss measured at 15 feet (4.6 meters) from any surface of the package.

(e) A material in the same packaging, freight container, or overpack with another material, the mixing of which is likely to cause a dangerous evolution of heat, flammable or poisonous gases or vapors, or to produce corrosive materials.

(f) A package containing a material which is likely to decompose or polymerize at a temperature of 130 °F (54.4 °C) or less with an evolution of a dangerous quantity of heat or gas unless stabilized or inhibited in a manner that will preclude such evolution, subject to the following:

(1) For organic peroxides, the decomposition temperature of 130 °F (54.4 °C) does not apply if the controlled temperature requirements specified in Chapter 11 of the UN Recommendations are applied to determine when refrigeration is required, and refrigeration is approved as required by paragraph (f)(3) of this section.

(2) The determination of whether a material is forbidden under this paragraph may be made by using the Self Accelerating Decomposition Temperature (SADT) Test published by the Organic Peroxide Producers Safety Division (OPPSD).

(3) Refrigeration may be used as a means of stabilization only when approved by the Director, OHMT. For status of approvals previously issued by the Bureau of Explosives, see § 171.19 of this subchapter.

(g) Packages which give off a flammable gas or vapor, released from a material not otherwise subject to this subchapter, likely to create a flammable mixture with air in a transport vehicle.

(h) Packages containing materials (other than those classed as explosive) which will detonate in a fire.

(1) For purposes of this paragraph, "detonate" means an explosion in which the shock wave travels through the material at a speed greater than the speed of sound.

(2) When tests are required to evaluate the performance of a package under the provisions of this paragraph, the testing must be done or approved by one of the agencies specified in § 173.86.

(i) Except as noted in paragraph (i)(1) of this section, a package containing a cigarette lighter, or other similar device, equipped with an ignition element and containing fuel.

(1) A cigarette lighter or similar device subject to this paragraph may be shipped if the design of the device and its packaging has been examined by the Bureau of Explosives and specifically approved by the Director, OHMT. The examination of cigarette lighters and similar devices containing gaseous fuel will include scrutiny for compliance with § 173.308 of this part. For the status of approvals previously issued by the Bureau of Explosives, see § 171.19 of this subchapter.

In § 173.23, paragraph (a) would be revised as follows:

§ 173.23 Previously authorized packaging.

(a) When the regulations specify a packaging with a specification marking prefix of "DOT," a packaging marked prior to January 1, 1970, with the prefix of "ICC" may be used in its place if the packaging otherwise conforms to applicable specification requirements.

* * * * *

Section 173.24 would be revised as follows:

§ 173.24 General requirements for packagings and packages.

(a) *Applicability.* Except as otherwise provided in this subchapter, the provisions of this section apply to—

(1) Bulk and non-bulk packagings;

(2) New packagings and packagings which are reused; and

(3) Specification and non-specification packagings.

(b) Each package used for the shipment of hazardous materials under this subchapter shall be designed, constructed, maintained, filled, its contents so limited, and closed, so that under conditions normally incident to transportation—

(1) There will be no release of hazardous materials to the environment;

(2) The effectiveness of the packaging will not be significantly reduced; and

(3) There will be no mixture of gases or vapors in the package which could, through any credible spontaneous increase of heat or pressure, significantly reduce the effectiveness of the packaging.

(c) *Authorized packagings.* A packaging is authorized for a hazardous material only if—

(1) The packaging is prescribed or permitted for the hazardous material in a packaging section specified for that material in Column 8 of the § 172.101 Table and conforms to applicable requirements in the special provisions of Column 7 of the § 172.101 Table and, for specification packagings (including UN standard packagings), the specification requirements in Parts 178 and 179 of this subchapter; or

(2) The packaging is permitted under and conforms to provisions contained in §§ 171.11, 171.12, 171.12a, 173.3, 173.4, 173.5, 173.6, 173.7, or 176.11 of this subchapter.

(d) *DOT specification and UN standard packagings.* For DOT specification packagings (including UN standard packagings), conformance to the applicable specifications in Parts 178 and 179 of this subchapter is required in all details. For performance-oriented packagings covered by Subpart L of Part 178 of this subchapter, each packaging must be capable of meeting the performance test requirements specified in Subpart M of Part 178 of this subchapter for the applicable packing group shown in Column 5 of the § 172.101 Table.

(e) *Compatibility.* (1) Even though certain packagings are specified in this Part, it is, nevertheless, the responsibility of the person offering a hazardous material for transportation to ensure that such packagings are compatible with their lading. This particularly applies to corrosivity, permeability, softening, premature aging and embrittlement.

(2) Packaging materials and contents must be such that there will be no significant chemical or galvanic reaction between the materials and contents of the package.

(3) *Plastic packagings and receptacles.* (i) Plastic used in packagings and receptacles must be of a type compatible with the lading and may not be permeable to an extent that a hazardous condition is likely to occur during transportation, handling or refilling.

(ii) Each plastic packaging or receptacle which is used for liquid hazardous material must be capable of withstanding without failure the procedure specified in Appendix B of this Part ("Procedure for Testing Chemical Compatibility and Rate of Permeation in Plastic Packagings and Receptacles"). The maximum rate of permeation of hazardous lading through or into the plastic packaging or receptacles may not exceed 0.5 percent for materials meeting the definition of a Division 6.1 material according to § 173.132 and 2.0 percent for other hazardous materials, when subjected to a temperature no lower than—

(A) 18 °C (64 °F) for 180 days in accordance with Test Method 1;

(B) 50 °C (122 °F) for 28 days in accordance with Test Method 2; or

(C) 60 °C (140 °F) for 14 days in accordance with Test Method 3.

(iii) Alternative procedures or rates of permeation are permitted if they yield a level of safety equivalent to or greater than that provided by paragraph (e)(3)(ii) of this section and are specifically approved by the Director, OHMT.

(4) *Mixed contents.* (i) Hazardous materials may not be packed or mixed together in the same outer packaging with other hazardous or nonhazardous materials if such materials are capable of reacting dangerously with each other and causing—

(A) Combustion or dangerous evolution of heat;

(B) Evolution of flammable, poisonous or asphyxiant gases;

(C) Formation of corrosive materials; or

(D) Formation of unstable materials.

(f) *Closures.* (1) Closures on packagings shall be so designed and closed that under conditions (including the effects of temperature and vibration) normally incident to transportation—

(i) Except as provided in paragraph (g) of this section, there is no release of hazardous materials to the environment from the opening to which the closure is applied; and

(ii) The closure is secure and leakproof.

(2) Except as otherwise provided in this subchapter, a closure (including gaskets or other closure components, if any) used on a specification packaging must conform to all applicable requirements of the specification.

(g) *Venting.* Venting of packagings, to reduce internal pressure which may develop by the evolution of gas from the contents, is permitted only when—

(1) Transportation by aircraft is not involved;

(2) Except as otherwise provided in this subchapter, the evolved gases are not toxic, flammable or asphyxiant gases;

(3) The packaging is designed so as to preclude a significant release of hazardous materials from the receptacle; and

(4) For shipments in bulk packagings, venting is authorized for the specific hazardous material by a special provision in the § 172.101 Table or by the applicable bulk packaging specification in Part 178 of this subchapter.

(h) *Outage and filling limits.* (1) *General.* When filling packagings and receptacles for liquids, sufficient ullage (outage) must be left to ensure that neither leakage nor permanent distortion of the packaging or receptacle will occur as a result of an expansion of the liquid caused by temperatures likely to be encountered during transportation. Liquids must not completely fill a receptacle at a temperature of 55 °C (131 °F) or less.

(2) *Compressed gases and cryogenic liquids.* Filling limits for compressed gases and cryogenic liquids are specified in §§ 173.301 through 173.306 for cylinders and §§ 173.314 through 173.319 for bulk packagings.

(i) *Air transportation.* Packages offered or intended for transportation by aircraft must conform to the general requirements for transportation by aircraft in § 173.27.

Section 173.24a would be added, as follows:

§ 173.24a Additional general requirements for non-bulk packagings and packages.

(a) *Packaging design.* (1) *Closures.* A closure device must be so designed that it is unlikely that it can be incorrectly or incompletely closed, and must be such that it may be checked easily to determine that it is completely closed. Except as provided in § 172.312 of this subchapter, a combination packaging containing liquid hazardous materials must be packed so that closures on inner receptacles are upright.

(2) *Friction.* The nature and thickness of the outer packaging must be such that friction during transportation is not likely to generate an amount of heat sufficient to alter dangerously the chemical stability of the contents.

(3) *Securing and cushioning.* Inner packagings of combination packagings must be so packed, secured and cushioned to prevent their breakage or leakage and to control their movement within the outer packaging under conditions normally incident to transportation. Cushioning material must not be capable of reacting dangerously with the contents of the inner packagings.

(4) *Metallic devices.* Nails, staples and other metallic devices shall not protrude into the interior of the outer packaging in such a manner as to be likely to damage inner packagings or receptacles.

(5) *Vibration.* Each non-bulk package must be capable of withstanding, without rupture or leakage, the vibration test procedure specified in Appendix C of this Part ("Procedure for Base Level Vibration Testing").

(b) *Non-bulk packaging filling limits.* (1) A single or composite non-bulk packaging may be filled with a liquid hazardous material only when the specific gravity of the material does not exceed that marked on the packaging, or a specific gravity of 1.2 if not marked.

(2) A single or composite non-bulk packaging may not be filled with a solid hazardous material to a gross mass greater than the maximum gross mass marked on the packaging.

(3) Packagings tested as prescribed in § 178.605 of this subchapter and marked with the hydrostatic test pressure as prescribed in § 178.503(a)(5) of this subchapter may be used for liquids only when the vapor pressure of the liquid conforms to one of the following:

(i) The vapor pressure must be such that the total pressure in the packaging (i.e., the vapor pressure of the liquid plus the partial pressure of air or other inert gases, less 100 kPa (14.5 psi)) at 55 °C (131 °F), determined on the basis of a maximum degree of filling in accordance with subparagraph (1) of this paragraph and a filling temperature of 15 °C (59 °F), will not exceed two-thirds of the marked test pressure;

(ii) The vapor pressure at 50 °C (122 °F) must be less than four-sevenths of the sum of the marked test pressure plus 100 kPa (14.5 psi); or

(iii) The vapor pressure at 55 °C (131 °F) must be less than two-thirds of the sum of the marked test pressure plus 100 kPa (14.5 psi).

(c) *Mixed contents.* (1) An outer non-bulk packaging may contain more than one hazardous material only when—

(i) The inner and outer packaging used for each hazardous material conforms to the relevant packaging sections of this Part applicable to each of the hazardous materials;

(ii) The package as prepared for shipment meets the performance tests prescribed in Part 178 for the packing group indicating the highest order of hazard for the hazardous materials contained in the package;

(iii) Corrosive materials in bottles are further packed in securely closed inner receptables before packing in outer packagings; and

(iv) For transportation by aircraft, the total net quantity does not exceed the lowest permitted maximum net quantity per package as shown in Column 9a or 9b, as appropriate, of the § 172.101 Table. The permitted maximum net quantity must be calculated in kilograms if a package contains both a liquid and a solid.

(2) A packaging containing inner packagings of Division 6.2 materials may not contain other hazardous materials, except dry ice.

Section 173.24b would be added, as follows:

§ 173.24b Additional general requirements for bulk packagings and packages.

(a) *Pressure relief devices on bulk packagings.* Except when installed in series with a pressure relief valve, a non-reclosing pressure relief device may not be used on a bulk packaging containing a hazardous material that is flammable or poisonous or both.

(b) *Outage and filling limits.*—(1) *Tank car and multi-unit tank car tank filling limits.* (i) Hazardous materials may not be loaded into the dome of a tank car.

(ii) If the dome of the tank car does not provide sufficient outage, then vacant space must be left in the shell to make up the required outage.

(iii) Liquids other than flammable liquids must be so loaded in tank cars and multi-unit tank car tanks that the outage is at least one percent of the total capacity of the tank and dome at the reference temperature of 115 °F (46.1 °C) for uninsulated tanks and 105 °F (40.6 °C) for insulated tanks. Tanks must not be liquid full at 131 °F (55 °C).

(iv) Flammable liquids must be so loaded in tank cars and multiunit tank car tanks that the outage is at least two percent of the total capacity of the tank and dome at the reference temperature of 115 °F (46.1 °C) for uninsulated tanks and 105 °F (40.6 °C) for insulated tanks. Tanks must not be liquid full at 131 °F (55 °C).

(2) *Cargo tank and portable tank filling limits.* The outage in a cargo tank, portable tank, or compartment thereof must be at least one percent of the total capacity of the tank or compartment at the reference temperature of 115 °F (46.1 °C) for uninsulated tanks and 105 °F (40.6 °C) for insulated tanks. Tanks must not be liquid full at 131 °F (55 °C).

(3) *Bulk packagings for liquids toxic by inhalation.* For a liquid which is toxic by inhalation under the criteria in § 173.133(a)(2), the outage in a bulk packaging must be at least five percent of the total capacity of the tank or compartment at the reference temperature of 115 °F (46 °C) for uninsulated tanks and 105 °F (40.6 °C) for insulated tanks.

(c) *Equivalent steel.* Where the regulations permit steel other than stainless steel to be used in place of a specified stainless steel (for example, as in § 172.102 of this subchapter, special provision B30), the minimum thickness for the steel must be obtained from one of the following formulas, as appropriate:

Formula for metric units:

$$e_1 = \{10e_o/Rm_1A_1\}^{.8}$$

Formula for non-metric units:

$$e_1 = \{112.3e_o/Rm_1A_1\}^{.8}$$

where:

e_o = Required thickness of the reference stainless steel in millimeters or inches, for metric units or non-metric units, respectively;

e_1 = Equivalent thickness of the non-stainless steel in millimeters or inches, for metric units or non-metric units, respectively;

Rm_1 = Specified minimum tensile strength of the non-stainless steel (from the appropriate specification in Part 178 of this subchapter) in deka-newtons per square millimeter or pounds per square inch, for metric units or non-metric units, respectively;

A_1 = Specified minimum percentage elongation of the non-stainless steel (from the appropriate specification in Part 178 of this subchapter) multiplied by 100 (for example, 20% times 100 equals 20).

In § 173.25, paragraph (b) would be removed, paragraph (a)(3) would be revised, and paragraph (a)(5) would be added as follows:

§ 173.25 Authorized packages and overpacks.

(a) * * *

(3) Each package subject to the orientation marking requirements of § 172.312 of this subchapter is packed in the overpack with its filling holes up and the overpack is marked with package orientation marking arrows on two opposite vertical sides of the overpack with the arrows pointing in the correct direction of orientation.

* * * * *

(5) Packages containing corrosive or oxidizing materials in Packing Group I may not be overpacked with any other materials.

Section 173.26 would be revised as follows:

§ 173.26 Quantity limitations.

When quantity limitations do not appear in the packaging requirements of this subchapter, the permitted gross weight or capacity authorized for a packaging is as shown in the packaging specification or standard in Part 178 or 179, as applicable, of this subchapter.

Section 173.27 would be revised as follows:

§ 173.27 General requirements for transportation by aircraft.

(a) The requirements of this section are in addition to the requirements in § 173.24 and apply to packages offered or intended for transportation by aircraft. Notwithstanding any Packing Group III performance level specified in Column 5 of the § 172.101 Table, the required performance level for such packages when offered or intended for transportation by aircraft is at the Packing Group II performance level, unless otherwise excepted from performance requirements in Subpart E of this part.

(b) Packages authorized on board aircraft. (1) When Column 9a of the § 172.101 Table indicates that a material is "Forbidden", that material may not be offered for transportation or transported by passenger-carrying aircraft.

(2) When Column 9b of the § 172.101 Table indicates that a material is "Forbidden", that material may not be offered for transportation or transported by aircraft.

(3) The maximum quantity of hazardous material in a package that may be offered for transportation or transported by passenger-carrying aircraft or cargo aircraft may not exceed that quantity prescribed for the material in Column 9a or 9b, respectively, of the § 172.101 Table.

(4) A package containing a hazardous material which is authorized on cargo aircraft but not on passenger aircraft must be labeled with the CARGO AIRCRAFT ONLY label required by § 172.402(b) of this subchapter and may not be offered for transportation or transported on passenger-carrying aircraft.

(c) *Pressure requirements.* (1) Packagings must be designed and constructed to prevent leakage that may be caused by changes in altitude and temperature during transportation by aircraft.

(2) Packagings for which retention of liquid is a basic function must be capable of withstanding without leakage the greater of—

(i) An internal pressure which produces a pressure of not less than 75 kPa (10.88 psi) for liquids in Packing Group III of Class 3 or Division 6.1, or 95 kPa (13.8 psi) for other liquids; or

(ii) A pressure related to the vapor pressure of the liquid to be conveyed, determined by one of the following:

(A) The total pressure measured in the receptacle (i.e., the vapor pressure of the material and the partial pressure of air or other inert gases, less 100 kPa (14.5 psi)) at 55 °C (131 °F), multiplied by a safety factor of 1.5; determined on the basis of a filling temperature of 15 °C (59 °F) and a degree of filling such that the receptacle is not completely liquid full at a temperature of 55 °C (131 °F) or less;

(B) 1.75 times the vapor pressure at 50 °C (122 °F) less 100 kPa (14.5 psi); or

(C) 1.5 times the vapor pressure at 55 °C (131°) less 100 kPa (14.5 psi).

(3) Notwithstanding the provisions of subparagraph (2) of this paragraph—

(i) Hazardous materials may be contained in an inner packaging which does not itself meet the pressure requirement provided that the inner

packaging is packed within a supplementary packaging which does meet the pressure requirement and other applicable packaging requirements of this subchapter.

(ii) Packagings which are subject to the hydrostatic pressure test and marking requirements of §§ 178.605 and 178.504(a)(5), respectively, of this subchapter must have a marked test pressure of not less than 250 kPa (36.3 psi) for liquids in Packing Group I, 80 kPa (11.6 psi) for liquids in Packing Group III of Class 3 or Division 6.1, and 100 kPa (14.5 psi) for other liquids.

(d) *Closures.* Stoppers, corks or other such friction-type closures must be held securely, tightly and effectively in place by positive means.

(e) *Absorbent materials.* Except as otherwise provided in this subchapter, liquids in Packing Group I or II of Class 3, 4, 5, 6, or 8, when in glass or earthenware inner packagings, must be packaged using material capable of absorbing and not likely to react dangerously with the liquid. Absorbent material is not required if the inner packagings are so protected that breakage of them and leakage of their contents from the outer packaging is not likely to occur under normal conditions of transportation and is not required for packagings containing liquids in Packing Group III for transport on cargo aircraft only. Where absorbent material is required and an outer packaging is not liquid-tight, a means of containing the liquid in the event of leakage must be used in the form of a leakproof liner, plastic bag or other equally efficient means of containment. Where absorbent material is required, the quantity and disposition of it in each outer packaging must be as follows:

(1) For packagings containing liquids in Packing Group I for transport on passenger-carrying aircraft, each packaging must contain sufficient absorbent material to absorb the contents of all inner packagings containing such liquids;

(2) For packagings containing liquids in Packing Group I for transport on cargo aircraft only and packagings containing liquids in Packing Group II for transport on passenger aircraft, each package must contain sufficient absorbent material to absorb the contents of any one of the inner packagings containing such liquids and, where they are of different sizes and quantities, sufficient absorbent material to absorb the contents of the inner packaging containing the greatest quantity of liquid.

(f) *Combination packagings.* Unless otherwise specified in this Part, or in § 171.11 of this subchapter, when combination packagings are offered for transportation by aircraft, inner packagings must conform to the quantity limitations set forth in Table 1 for transport on passenger-carrying aircraft and Table 2 for transport on cargo aircraft only, as follows:

TABLE 1—MAXIMUM NET CAPACITY OF INNER PACKAGINGS FOR TRANSPORTATION ON PASSENGER-CARRYING AIRCRAFT

Maximum net quantity per package column 9a of the § 172.101 table	Maximum authorized net capacity of inner packagings	
	Glass, earthenware or fiber inner packagings	Metal or plastic inner packagings
Liquids:		
Not greater than 0.5L	0.5L	0.5L
Greater than 0.5L, not greater than 1L	0.5L	1L
Greater than 1L, not greater than 5L	1L	5L
Greater than 5L, not greater than 60L	2.5L	10L
Greater than 60L, not greater than 220L	5L	25L
Greater than 220L	No limit	No Limit
Solids:		
Not greater than 5 kg	0.5 kg	1 kg
Greater than 5 kg, not greater than 25 kg	1 kg	2.5 kg
Greater than 25 kg, not greater than 200 kg	5 kg	10 kg
Greater than 200 kg	No limit	No Limit

TABLE 2.—MAXIMUM NET CAPACITY OF INNER PACKAGINGS FOR TRANSPORTATION ON CARGO AIRCRAFT ONLY

Maximum net quantity per package from column 9b of the § 172.101 table	Maximum authorized net capacity of inner packagings	
	Glass, earthenware or fiber inner packagings	Metal or plastic inner packagings
Liquids:		
Not greater than 2.5L	1L	1L
Greater than 2.5L, not greater than 30L	2.5L	2.5L
Greater than 30L, not greater than 60L	5L	10L
Greater than 60L, not greater than 220L	5L	25L
Greater than 220L	No limit	No limit
Solids:		
Not greater than 15 kg	1 kg	2.5 kg
Greater than 15 kg, not greater than 50 kg	2.5 kg	5 g
Greater than 50 kg, not greater than 200 kg	5 kg	10 kg
Greater than 200 kg	No limit	No limit

(g) *Cylinders.* For any cylinder containing hazardous materials and incorporating valves, sufficient protection must be provided to prevent operation of and damage to, the valves during transportation, by one of the following methods:

(1) By equipping each cylinder with securely attached valve caps or protective headrings; or

(2) By boxing or crating the cylinder.

(h) *Tank cars and cargo tanks.* Tank cars and cargo tanks containing hazardous materials may not be transported aboard aircraft.

Section 173.28 would be revised as follows:

§ 173.28 Reuse, reconditioning and remanufacture of packagings.

(a) *Reuse.* Packagings and receptacles used more than once must be in such condition, including closure devices and cushioning materials, that they conform in all respects to the prescribed requirements of this subchapter, including the following provisions and limitations:

(1) Before reuse, each packaging must be inspected and must not be reused unless free from rupture, corrosion, other damage or incompatible residue;

(2) Before reuse, packaging subject to the leakproofness test with air prescribed in § 178.604 shall be leakproofness tested and marked as required by paragraph (b) of this section and § 178.503(c) of this subchapter;

(3) Packagings made of paper, plastic film, textile or fiberboard are not authorized for reuse; and

(4) Metal and plastic drums, jerricans and the metal or plastic outer packagings of composite packagings are authorized for reuse only when they are marked in millimeters with the minimum thickness of the packaging material and conform to the following minimum construction criteria:

Marked, or rated, capacity (net mass) not over	Minimum thickness of packaging material	
	Metal drum or jerrican	Plastic drum or jerrican
20L (20 kg)	0.6 mm (0.024 in.)	1.2 mm (0.047 in.)
40L (40 kg)	0.7 mm (0.028 in.)	1.8 mm (0.071 in.)
120L (120 kg)	0.9 mm (0.035 in.)	2.2 mm (0.087 in.)
220L (220 kg)	1.0 mm (0.039 in.)	2.2 mm (0.087 in.)
450L (400 kg)	1.8 mm (0.071 in.)	5.0 mm (0.197 in.)

(5) Plastic inner packagings of composite packagings must have a minimum thickness of 1.5mm (0.059 inch).

(b) *Reconditioning.* For the purpose of this subchapter, reconditioning is the repair, replacement of non-integral packaging components (such as removable gaskets, closure devices, cushioning material, etc.) or leakproofness testing of non-bulk packagings, other than cylinders. A person who reconditions a packaging manufactured under the provisions of Subpart L of Part 178 of this subchapter, shall mark that packaging as required by

§ 178.503(c) of this subchapter. The marking is the certification of the reconditioner that the packaging conforms to the standard for which it is marked and that all functions performed by the reconditioner which are prescribed by this subchapter have been performed in compliance with this subchapter.

(c) *Remanufacture.* For the purpose of this subchapter, remanufacture is the conversion of a non-specification, non-bulk packaging to a DOT specification or UN standard, the conversion of a packaging meeting one specification or standard to another specification or standard (for example, conversion of 1A1 non-removable head drums to 1A2 removable head drums) or the replacement of integral structural packaging components (such as non-removable heads on drums). A person who remanufactures a non-bulk packaging to conform to a specification or standard in Part 178 of this subchapter is subject to the requirements of Part 178 as a manufacturer.

Section 173.29 would be revised as follows:

§ 173.29 Empty packagings.

(a) Except as otherwise provided in this section, an empty packaging containing only the residue of a hazardous material shall be offered for transportation and transported in the same manner as when it previously contained a greater quantity of that hazardous material.

(b) Notwithstanding the requirements of paragraph (a) of this section, an empty packaging is not subject to any other requirements of this subchapter if it conforms to the following provisions:

(1) Any hazardous material shipping name and identification number markings, and any hazard warning labels or placards are removed or obliterated. This provision does not apply to transportation in a transport vehicle or a freight container if the packaging is not visible during transportation and the packaging is loaded by the shipper and unloaded by the shipper or consignee;

(2) The packaging—

(i) Is unused; or

(ii) Is sufficiently cleaned of residue and purged of vapors to remove any potential hazard; or

(iii) Is refilled with a material which is not hazardous to such an extent that any residue remaining in the packaging no longer poses a hazard; or

(iv) Contains only the residue of—

(A) A Class 9 or ORM–D material; or

(B) An ORM–E material which no longer meets the definition in § 171.8 of this subchapter for either a hazardous substance or a hazardous waste; or

(C) A nonflammable gas with no subsidiary hazard at a pressure less than 40 psia (275.8 kPa) at 70° F (21° C); and

(3) Any material contained in the packaging does not meet the definitions in § 171.8 of this subchapter for either a hazardous substance or a hazardous waste.

(c) A non-bulk packaging containing only the residue of a hazardous material covered by Table 2 of § 172.504 of this subchapter—

(1) Does not have to be included in determining the applicability of the placarding requirements of Subpart F of Part 172 of this subchapter; and

(2) Is not subject to the shipping paper requirements of this subchapter when collected and transported by a contract or private carrier for reconditioning, remanufacture or reuse.

(d) Notwithstanding the stowage requirements in Columns 10a and 10b of the § 172.101 Table for transportation by vessel, an empty drum or cylinder may be stowed on deck or under deck.

(e) Specific provisions for describing an empty packaging on a shipping paper appear in § 172.203(e) of this subchapter.

(f) An empty tank car must conform to the placarding requirements specified in § 172.510(c) of this subchapter.

In § 173.31, in paragraph (a)(1) the words "dangerous articles" would be revised to read "hazardous materials", paragraphs (a)(5), (a)(6) and (a)(7) would be revised, and paragraphs (a)(8) through (a)(12) would be added, as follows:

§ 173.31 Qualification, maintenance, and use of tank cars.

(a) * * *

(5) Each DOT specification tank car shall be equipped with a coupler vertical restraint system in accordance with § 179.14 of this subchapter.

(6) After December 31, 1987, each non-specification tank car shall be equipped with a coupler vertical restraint system in accordance with § 179.14 of this subchapter.

(7) Pressure relief devices on tank car tanks must be of a type and design approved by the AAR Committee on Tank Cars and be made of metal not subject to deterioration by the lading.

(8) A Specification DOT–106A or 110A multi-unit tank car tank may be offered for transportation aboard a passenger vessel only as authorized in § 173.32(a)(4).

(9) Lading temperature must be within the tank design temperature range.

(10) Tank test pressure must be equal to or greater than the greatest of the following:

(i) 160 percent of the sum of lading vapor pressure at the reference temperature of 46.1° C (115° F) for uninsulated tanks or 40.6° C (105° F) for insulated tanks plus static head plus gas padding pressure in the ullage space or dome of tank;

(ii) 133 percent of the maximum loading or unloading pressure, whichever is greater; or

(iii) The minimum pressure prescribed by the specification in Part 179 of this subchapter or for the specific hazardous material in the applicable packaging section in Subpart F or G of this Part.

(11) Air pressure may not be used to load or unload any lading which may create an enriched mixture within the flammability range of the lading in the vapor space of the tank.

(12) Tank car tanks in service for Class 3, 4 or Division 6.1 liquids must be equipped with reclosing pressure relief devices having adequately sized venting capacity.

* * * * *

In § 173.32 paragraph (a)(6), and paragraphs (q) through (u) would be added as follows:

§ 173.32 Qualification, maintenance and use of portable tanks.

(a) * * *

(6) A DOT 51 portable tank may be used where DOT 56 or DOT 57 type portable tanks or DOT 60 portable tanks are authorized. A DOT 60 portable tank may be used where DOT 56 or DOT 57 type portable tanks are authorized. A higher integrity tank used instead of a specified portable tank must meet the same design profile; e.g., a DOT 51 portable tank must be lined, if used instead of a lined DOT 60 portable tank.

* * * * *

(q) *Loading requirements.* A portable tank may not be loaded with a hazardous material that—

(1) Has a lading density exceeding the tank's design maximum density, or

(2) Is warmer or colder than the tank's design temperature range.

(r) Tank design pressure must be equal to or greater than the greatest of the following:

(1) 120 percent of the sum of lading vapor pressure plus static head plus gas padding pressure in the ullage space or dome of tank;

(2) The maximum loading or unloading pressure, whichever is greater; or

(3) The pressure prescribed for the specific hazardous material in Subpart F

or G of this part, or in Part 172, as applicable.

(s) Where a DOT 60 or marine portable tank is authorized, minimum tank design pressure is 25 psi (172.4 Kpa) for any liquid lading that meets more than one hazard class definition, unless otherwise specified.

(t) Air pressure may not be used to load or unload any lading which may create an enriched mixture within the flammability range of the lading in the vapor space of the tank.

(u) A portable tank in service for a Class 3 or 4 material, or Division 6.1 liquid, must be equipped with a reclosing pressure relief valve having adequately-sized venting capacity.

In § 173.32c, paragraphs (a), (b), (g)(2) and (o) would be revised to read as follows:

§ 173.32c Use of Specification IM portable tanks.

(a) No person may offer a hazardous material for transportation in an IM portable tank except as authorized by this subchapter.

(b) Except as otherwise provided in this subpart, an IM portable tank may not be used for the transportation of a hazardous material unless it meets the requirements of this subchapter.

* * * * *

(g) * * *

(2) When this subparagraph is specified for a hazardous material by the IM Tank Table in § 172.102 of this subchapter, each filling or discharge connection located below the normal liquid level of the tank, or compartment thereof, has three serially-mounted closures consisting of an internal discharge valve capable of being closed from a location remote from the valve itself, an external valve, and a bolted blank flange or other suitable, liquid-tight closure on the outlet side of the external valve.

* * * * *

(o) An IM 101 tank may be used whenever an IM 102 tank is authorized provided it meets the requirements for pressure relief devices, bottom outlets and any other special provisions specified for the IM 102 tank in § 172.102 of this subchapter.

§ 173.32d [Removed]

Section 173.32d would be removed.

In 173.33, paragraphs (l) through (q) would be added, as follows:

§ 173.33 Qualification, maintenance and use of cargo tanks.

* * * * *

(l) A cargo tank may not be loaded with a hazardous material that:

(1) Has a density exceeding the tank's design maximum density; or

(2) Is warmer or colder than the tank design temperature range.

(m) Tank design pressure must be equal to or greater than the greatest of the following:

(1) 120 percent of the sum of lading vapor pressure plus static head plus gas padding pressure in the ullage space or dome of tank;

(2) The maximum loading or unloading pressure, whichever is greater; or

(3) The pressure prescribed in Subpart F or G of this part, for the specific hazardous material as applicable, including—

(i) For compressed gases and certain refrigerated liquids, the pressure prescribed in § 173.315; and

(ii) For cryogenic liquids, the pressure prescribed in § 173.318.

(n) An MC 331 type cargo tank may be used where MC 306, MC 307 or MC 312 type cargo tanks are authorized. An MC 307 or MC 312 type cargo tank may be used where MC 306 type cargo tanks are authorized. A higher integrity tank used in lieu of a specified tank must meet the same design profile (for example, an MC 331 cargo tank must be lined if used in place of a lined MC 312 cargo tank.)

(o) Unless otherwise specified, where MC 307 and MC 312 cargo tanks are authorized, minimum tank design pressure is 25 psi (172.4 kPa) for any liquid lading that meets more than one hazard class definition.

(p) Air pressure may not be used to load or unload any lading which may create an enriched mixture within the flammability range of the lading in the vapor space of the tank. (See § 173.33(b)(3).)

(q) A cargo tank in service for a Class 3 or 4 material or Division 6.1 liquid must be equipped with a reclosing pressure relief valve having adequately-sized venting capacity. (See § 173.33(d)(1) and (2).)

A new § 173.40 would be added to read as follows:

§ 173.40 General packaging requirements for poisonous materials required to be packaged in cylinders.

When this section is referenced in the packaging section for a hazardous material elsewhere in this Part, the following requirements are applicable to cylinders used for that material:

(a) *Authorized cylinders.* A cylinder must conform to one of the specifications for cylinders in Subpart C of Part 178 of this subchapter, except that Specification 8, 8AL and 39 cylinders are not authorized.

(b) *Outage and pressure requirements.* The pressure of the hazardous material at 55° C (131° F) must not exceed the service pressure of the cylinder. Sufficient outage shall be provided so that the cylinder will not be liquid full at 55° C (131° F).

(c) *Closures.* Each cylinder must be closed with a plug or valve conforming to the following:

(1) Each plug or valve must have a taper-threaded connection directly to the cylinder and be capable of withstanding the test pressure of the cylinder;

(2) Each valve must be of the packless type with non-perforated diaphram, except that for corrosive materials, a valve may be of the packed type provided the assembly is made gas-tight by means of a seal cap with gasketed joint attached to the valve body or the cylinder to prevent loss of material through or past the packing;

(3) Each valve outlet must be sealed by a threaded cap or threaded solid plug, and

(4) Cylinder, valves, plugs, outlet caps, luting and gaskets must be compatible with each other and with the lading.

(d) *Additional protection.* Additional protection requirements for thin-walled cylinders and for cylinders equipped with valves are as follows:

(1) Each cylinder which has a wall thickness at any point of less than 2.03 mm (0.080 inch) and each cylinder which does not have fitted valve protection must be overpacked in a 4C1, 4D, 4F, 4G, 4H1 or 4H2 box. The box must conform to overpack provisions in § 173.25. Box and valve protection must be of sufficient strength to protect all parts of the cylinder and valve, if any, from deformation and breakage resulting from a drop of 2.0 meters (6.56 ft) or more onto a concrete floor, impacting at an orientation most likely to cause damage.

(2) Each cylinder equipped with a valve, if not overpacked in a box in accordance with paragraph (d)(1) of this section, must be equipped with a protective cap or other means of valve protection sufficient to protect the valve from deformation and breakage resulting from a drop of 2.0 meters (6.56 ft) or more onto a concrete floor, impacting at an orientation most likely to cause damage.

(e) *Interconnection.* Cylinders may not be interconnected.

In Part 173, Subparts D, E and F would be revised as follows:

Subpart D—Definitions, Classification, Packing Group Assignments and Exceptions for Hazardous Materials other than Class 1 and Class 7

§ 173.115 Class 2, Divisions 2.1, 2.2, and 2.3—Definitions.

(a) *Division 2.1 (Flammable gas).* (1) For the purpose of this subchapter, a "flammable gas" (Division 2.1) means any material which is a gas at 20° C (68° F) or less and 1 atmosphere (atm) of pressure (a material which has a boiling point of 20° C (68° F) or less at 1 atm) which—

(i) Is ignitable at 1 atm when in a mixture of 13% or less by volume with air; or

(ii) Has a flammable range at 1 atm with air of at least 12% regardless of the lower limit.

(2) The limits specified in paragraph (a)(1) of this section shall be determined at 1 atmosphere of pressure and a temperature of 20° C (68° F) in accordance with ASTM E681–79 Standard Test Method for Limits of Flammability of Chemicals.

(b) *Division 2.2 (non-flammable compressed gas—including compressed gas, liquefied gas, pressurized cryogenic gas and compressed gas in solution).* For the purpose of this subchapter, a "non-flammable compressed gas" (Division 2.2) means any material (or mixture) which—

(1) Exerts in the packaging a pressure of 40 psia (275.8 kPa) at 21.1° C (70° F) or, regardless of the pressure at 21.1° C (70° F), exerts in the container a pressure of 104 psia (717.1 kPa) at 54.4° C (130° F); and

(2) Does not meet the definition of Division 2.1 or 2.3.

(c) *Division 2.3 (Poisonous gas).* For the purpose of this subchapter, "poisonous gas" (Division 2.3) means a material which is a gas at 20° C (68° F) or less and one atmosphere of pressure (a material which has a boiling point of 20° C (68° F) or less at 1 atmosphere and which—

(1) Is known to be so toxic to humans as to pose a hazard to health during transportation, or

(2) In the absence of adequate data on human toxicity, is presumed to be toxic to humans because when tested on laboratory animals it has an LC50 less than 5000 ppm.

(d) *Non-liquefied compressed gas.* A "non-liquefied compressed gas" means a gas, other than in solution, which in a packaging under the charged pressure is entirely gaseous at a temperature of 20° C (68° F).

(e) *Liquefied compressed gas.* A "liquefied compressed gas" means a gas which in a packaging under the charged pressure, is partially liquid at a temperature of 20° C (68° F).

(f) *Compressed gas in solution.* A "compressed gas in solution" is a non-liquefied compressed gas which is dissolved in a solvent.

(g) *Cryogenic liquid.* A "cryogenic liquid" means a refrigerated liquefied gas having a boiling point colder than −130° F (−90° C) at one atmosphere, absolute. A material meeting this definition is subject to requirements of this subchapter without regard to whether it meets the definition of a non-flammable compressed gas in paragraph (b) of this section. Each cryogenic liquid is partially described as "(* * *, refrigerated liquid (cryogenic liquid))" in the § 172.101 Table.

(h) *Flammable range.* The term "flammable range" means the difference between the minimum and maximum volume percentages of the material in air that forms a flammable mixture.

(i) *Service pressure.* The term "service pressure" means the authorized pressure marking on the packaging. For example, for a cylinder marked "DOT 3A1800", the service pressure is 1800 psig.

(j) *Refrigerant gas or Dispersant gas.* The terms "Refrigerant gas" or "Dispersant gas" apply to all nonpoisonous refrigerant gases, dispersant gases (fluorocarbons) listed in §§ 172.101, 173.304(a)(2), 173.314(c), 173.315(a)(1) and 173.315(h), and mixtures thereof, or any other compressed gas meeting one of the following:

(1) A nonflammable mixture containing not less than 50% fluorocarbon content, having a vapor pressure not exceeding 260 psig (1792.7 kPa) at 130° F (54.4° C).

(2) A flammable mixture containing not less than 50% fluorocarbon content, not over 40% by weight of a flammable component, having a vapor pressure not exceeding 260 psig (1792 kPa) at 130° F (54.4° C).

§ 173.116 Class 2 Assignment of packing group.

(a) The packing group of a Class 2, Division 2.3 material is assigned in Column 5 of the § 172.101 Table. There are no packing groups for Divisions 2.1 and 2.2. When the § 172.101 Table provides more than one packing group for a Division 2.3 material, or indicates that the packing group be determined on the basis of the grouping criteria for Division 2.3, the packing group shall be determined by applying the following criteria:

Packing group	Inhalation toxicity
IA	LC50 less than or equal to 200 ppm.
IB	LC50 greater than 200 ppm and less than or equal to 1000 ppm.
II	LC50 greater than 1000 ppm and less than or equal to 3000 ppm.
III	LC50 greater than 3000 ppm or less than or equal to 5000 ppm.

(b) The criteria specified in paragraph (a) of this section are represented graphically in § 173.133, Figure 1.

§ 173.120 Class 3—Definitions.

(a) *Flammable liquid.* (1) For the purpose of this subchapter, a "flammable liquid" (Class 3) means any liquid having a flash point of not more than 60.5° C (141° F) with the following exceptions:

(i) Any liquid meeting one of the definitions specified in § 173.300 of this part.

(ii) Any mixture having one or more components with a flash point greater than 60.5° C (141° F) or higher, that makes up at least 99 percent of the total volume of the mixture.

(2) For the purposes of this subchapter, a distilled spirit of 140 proof or lower is considered to have a flash point no lower than 23° C (73° F).

(b) *Combustible liquid.* (1) For the purpose of this subchapter, a "combustible liquid" (Class 3) means—

(i) Any liquid that does not meet the definition of any other hazard class specified in this subchapter and has a flash point above 60.5° C (141° F) and below 93.3° C (200° F); or

(ii) Any material that does not meet the definition of any other hazard class specified in this subchapter, has a flash point of 93.3° C (200° F) or greater and is offered for transportation or transported as a liquid at a temperature at or above its flash point.

(2) If a material has a flash point at or above 93.3° C (200° F) and does not meet the definition of a combustible liquid or any other hazard class, then it is not subject to the requirements of this subchapter.

(3) Except when offered or intended for transportation by vessel or aircraft, a flammable liquid with a flash point at or above 38° C (100° F) that does not meet the definition of any other hazard class may be reclassed as a combustible liquid.

(c) *Flash point.* (1) "Flash point" means the minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid. It shall be determined as follows:

(i) For a homogeneous, single-phase, liquid having a viscosity less than 45 S.U.S. at 38° C (100° F) that does not form a surface film while under test, one of the following test procedures shall be used:

(A) Standard Method of Test for Flash Point by Tag Closed Tester (ASTM D56–79); or

(B) Standard Methods of Test for Flash Point of Liquids by Setaflash Closed Tester (ASTM D3278–78).

(ii) For a liquid other than one meeting all of the criteria of paragraph (c)(1)(i) of this section, one of the following test procedures shall be used:

(A) Standard Method of Test for Flash Point by Pensky-Martens Closed Tester (ASTM D93–80). For cutback asphalt, use Method B of ASTM 93–80 or alternate tests authorized in this standard; or

(B) Standard Methods of Test for Flash Point of Liquids by Setaflash Closed Tester (ASTM D3278–78).

(2) For a liquid that is a mixture of compounds that have different volatility and flash points, its flash point shall be determined as specified in paragraph (c)(1) of this section, on the material in the form in which it is to be shipped. If it is determined by this test that the flash point is higher than 20° F (−6.7° C) a second test shall be made as follows: A portion of the mixture shall be placed in an open beaker (or similar container) of such dimensions that the height of the liquid can be adjusted so that the ratio of the volume of the liquid to the exposed surface area is 6 to one. The liquid shall be allowed to evaporate under ambient pressure and temperature (20 to 25° C) for a period of 4 hours or until 10 percent by volume has evaporated, whichever comes first. A flash point is then run on a portion of the liquid remaining in the evaporation container and the lower of the two flash points shall be the flash point of the material.

(3) For flash point determinations by Setaflash closed tester, the glass syringe specified need not be used as the method of measurement of the test sample if a minimum quantity of 2 milliliters is assured in the test cup.

(d) If experience or other data indicate that the hazard of a material is greater or less than indicated by the criteria specified in paragraphs (a) and (b) of this section, the Director, OHMT, may revise the classification or make the material subject or not subject to the requirements of Parts 170–189 of this subchapter.

§ 173.121 Class 3—Assignment of Packing Group.

(a) The packing group of a Class 3 material is as assigned in Column 5 of the § 172.101 Table. When the § 172.101 Table provides more than one packing group for a hazardous material, or indicates that the packing group is to be determined on the basis of the grouping criteria for Class 3, the packing group shall be determined by applying the following criteria:

Packing group	Flash point (closed-cup)	Initial boiling point
I		<35° C (95° F)
II	<23° C (73° F)	>35° C (95° F)
III	>23° C,<60.5° C (141° F)	>35° C (95° F)

(b) *Criteria for inclusion of viscous Class 3 materials in Packing Group III.*

(1) Viscous Class 3 materials in Packing Group II with a flash point of less than 23° C (73° F) may be grouped in Packing Group III provided that—

(i) Less than 3 percent of the clear solvent layer separates in the solvent separation test;

(ii) The mixture contains not more than 5 percent of substances in Packing Group I or II of Division 6.1 or Class 8, or not more than 5 percent of substances in Packing Group I of Class 3 requiring a POISON or CORROSIVE subsidiary label;

(iii) The capacity of the packaging is not more than 30 L (7.9 gallons); and

(iv) The viscosity and flash point are in accordance with the following table:

Flowtime in seconds		Flash point in degrees C
4 mm Cup	6 mm Cup	
Over 20		Over 17.
Over 60		Over 10.
Over 100		Over −5.
Over 160		Over −1.
Over 220	Over 17	Over −5.
	Over 40	No lower limit.

(2) The methods by which the tests referred to in paragraph (b)(1) shall be performed are as follows:

(i) *Viscosity Test.* The flowtime in seconds is determined at 23 °C (73 °F) using the ISO Standard cup with a 4.0 millimeters (0.16 inches) jet (ISO–2431–72). Where the flowtime exceeds 200 seconds, a second test is carried out using the ISO standard cup but modified to take a jet of 8 millimeters (0.31 inches) diameter.

(ii) *Solvent Separation Test.* This test is carried out at 23 °C (73 °F) using a 100.0 milliliters (3.38 ounces) measuring cylinder of the stoppered type of approximately 25.0 centimeters (9.84 inches) total height and of a uniform internal diameter of approximately 30 millimeters (1.18 inches) over the calibrated section. The sample should be stirred to obtain a uniform consistency, and poured in up to the 100 milliliter mark. The stopper should be inserted and the cylinder left standing undisturbed for 24 hours. After 24 hours, the height of the upper separated layer should be measured and the percentage of this layer as compared with the total height of the sample calculated.

§ 173.124 Class 4, Divisions 4.1, 4.2 and 4.3—Definitions.

(a) *Division 4.1 (Flammable solid).* For the purpose of this subchapter, "flammable solid" (Division 4.1) means any solid material, other than one classed as an explosive, which, under the conditions normally incident to transportation is likely to cause fires through friction, retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious transportation hazard.

(b) *Division 4.2 (Spontaneously combustible material).* For the purpose of this subchapter, "spontaneously combustible material" (Division 4.2) means a material which is likely to heat spontaneously under conditions normally incident to transportation, or to heat up in contact with air and being then likely to catch fire. This class includes pyrophoric liquids. A "pyrophoric liquid" means a liquid that ignites spontaneously in dry or moist air at or below 54.5 °C (130.1 °F).

(c) *Division 4.3 (Dangerous when wet materials).* For the purpose of this subchapter, "dangerous when wet material" (Division 4.3) means a material that, by interaction with water, is liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

§ 173.125 Class 4—Assignment of Packing Group.

The packing group of a Class 4 material shall be as assigned in Column 5 of the § 172.101 Table.

§ 173.128 Class 5, Divisions 5.1 and 5.2—Definitions.

(a) *Division 5.1 (Oxidizer).* For the purpose of this subchapter, "oxidizer" (Division 5.1) means a material such as a chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of organic matter.

(b) *Division 5.2 (Organic peroxide).* For the purpose of this subchapter "organic peroxide" (Division 5.2) means an organic compound containing the bivalent -0-0- structure and which may be considered a derivative of hydrogen

peroxide where one or more of the hydrogen atoms have been replaced by organic radicals unless:

(1) The material meets the definition of an explosive as prescribed in Subpart C of this part, in which case it must be classed as an explosive,

(2) The material is forbidden to be offered for transportation according to § 172.101 or § 173.21 of this subchapter,

(3) It is determined that the predominant hazard of the material containing an organic peroxide is other than that of an organic peroxide, or

(4) The Director, OHMT, has determined that the material does not present a hazard in transportation.

§ 173.129 Class 5—Assignment of Packing Group.

The packing group of a Class 5 material shall be as assigned in Column 5 of the § 172.101 Table.

§ 173.132 Class 6, Division 6.1—Definitions.

(a) For the purpose of this subchapter, "poisonous materials" (Division 6.1) means a material, other than a gas, which is known to be so toxic to humans as to afford a hazard to health during transportation, or which, in the absence of adequate data on human toxicity, is presumed to be toxic to humans because it falls within any one of the following categories when tested on laboratory animals:

(1) *Oral Toxicity.* A liquid with an LD_{50} for acute oral toxicity of not more than 500 mg/kg or a solid with an LD_{50} for acute oral toxicity of not more than 200 mg/kg.

(2) *Dermal Toxicity.* A material with an LD_{50} for acute dermal toxicity of not more than 1000 mg/kg.

(3) *Inhalation Toxicity.* (i) A dust or mist with an LC_{50} for acute toxicity on inhalation of not more than 10 mg/L; or

(ii) A material with a saturated vapor concentration in air at 20 °C (68 °F) of not more than one-fifth of the LC_{50} for acute toxicity on inhalation of vapors and with an LC_{50} for acute toxicity on inhalation of vapors of not more than 5000 ml/m³.

(b) For the purposes of this subchapter—

(1) LD_{50} for acute toxicity means that dose of the material administered which is most likely to cause death within 14 days in half of both male and female young adult albino rats. The number of animals tested must be sufficient to give a statistically significant result and be in conformity with good pharmacological practices. The result is expressed in mg/kg body mass.

(2) LD_{50} for acute dermal toxicity means that dose of the material which, administered by continuous contact for 24 hours with the bare skin of an albino rabbit, is most likely to cause death within 14 days in half of the animals tested. The number of animals tested must be sufficient to give a statistically significant result and be in conformity with good pharmacological practices. The result is expressed in mg/kg body mass.

(3) LC_{50} for acute toxicity on inhalation means that concentration of vapor, mist, or dust which, administered by continuous inhalation for one hour to both male and female young adult albino rats, is most likely to cause death within 14 days in half of the animals tested. If the material is administered to the animals as a dust or mist, more than 90 percent of the particles available for inhalation in the test must have a diameter of 10 microns or less if it is reasonably foreseeable that such concentrations could be encountered by a human during transport. The result is expressed in mg/L of air for dusts and mists or in mL/m³ of air (parts per million) for vapors.

(i) When provisions of this subchapter require the use of the LC_{50} for acute toxicity on inhalation of dusts and mists based on a one-hour exposure and such data is not available, the LC_{50} for acute toxicity on inhalation based on a four-hour exposure may be multiplied by four and the product substituted for the one-hour LC_{50} for acute toxicity on inhalation.

(ii) When the provisions of this subchapter require the use of the LC_{50} for acute toxicity on inhalation of vapors based on a one-hour exposure and such data is not available, the LC_{50} for acute toxicity on inhalation based on a four-hour exposure may be multiplied by two and the product substituted for the one-hour LC_{50} for acute toxicity on inhalation.

(c) The foregoing categories shall not apply if the Director, OHMT has determined that the physical characteristics of the material or its probable hazards to humans as shown by documented experience indicate that the material will not cause serious sickness or death.

§ 173.133 Division 6.1—Assignment of Packing Group.

(a) The packing group of Division 6.1 materials shall be as assigned in Column 5 of the § 172.101 Table. When the § 172.101 Table provides more than one packing group for a hazardous material, the packing group shall be determined by applying the following criteria:

(1) The packing group assignment for routes of administration other than inhalation of vapors shall be in accordance with the following table:

Packing group	Oral toxicity LD_{50} (mg/kg)	Dermal toxicity LD_{50} (mg/kg)	Inhalation toxicity by dusts and mists LC_{50} (mg/L)
I	≤5	≤40	≤0.5
II	>5, ≤50	>40, ≤200	>0.5, ≤2
III	solids: >50, ≤200	>200, ≤1000	>2, ≤10
	liquids: >50, ≤500		

(2) The packing group assignment based on inhalation of vapors shall be in accordance with the following table:

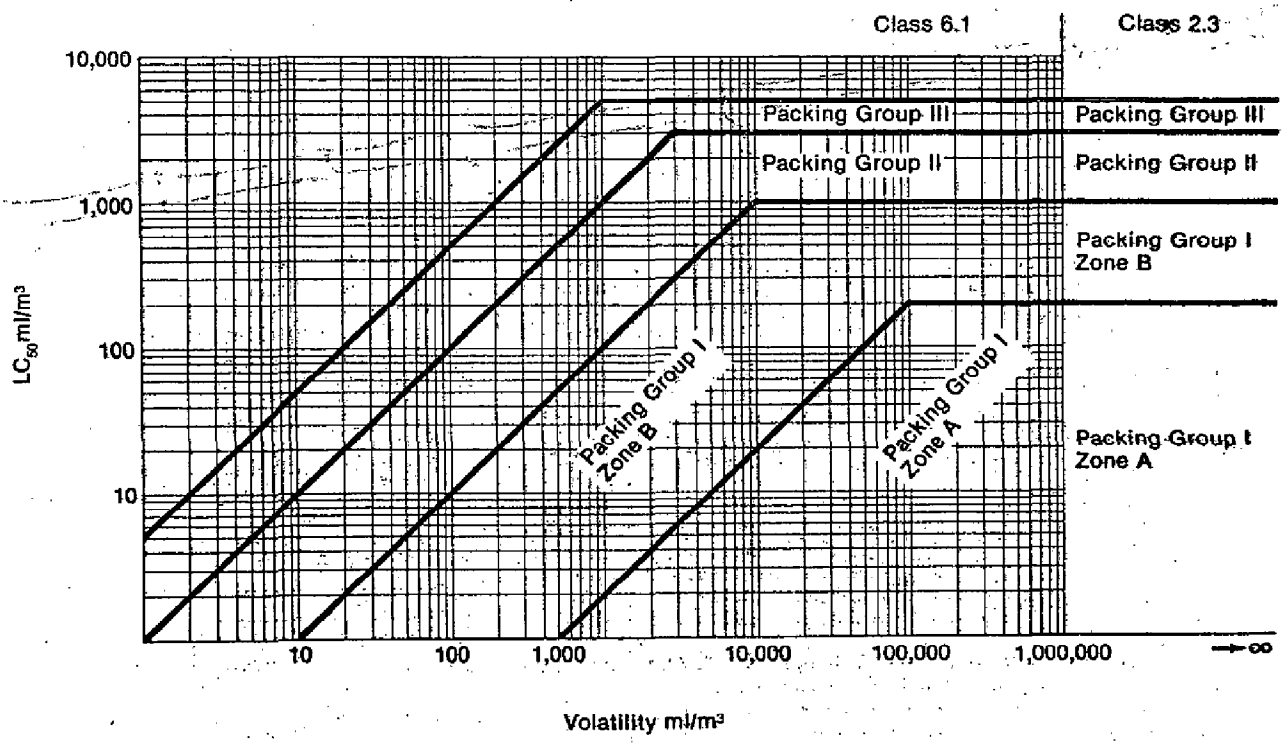
Packing group	Vapor concentration and toxicity
I, Zone A	V≥500 LC_{50} and LC_{50}≤200 mL/M³.
I, Zone B	V≥10 LC_{50}; LC_{50}≤1000 mL/m³; and the criteria for Packing Group I, Zone A are not met.
II	V≥LC_{50}; LC_{50}≤3000 mL/m³; and the criteria for Packing Group I are not met.
III	V≥.2 LC_{50}; LC_{50}≤5000 mL/m³; and the criteria for Packing Groups I and II are not met.

Note: V is the saturated vapor concentration in air of the material in mL/m³ at 20 °C and standard atmospheric pressure.

These criteria are represented graphically in Figure 1:

Figure 1

Inhalation Toxicity: Packing Group Borderlines



(3) When the packing group determined by applying these criteria is different for two or more (oral, dermal or inhalation) routes of administration, the packing group assigned to the material shall be that indicated for the highest degree of toxicity for any of the routes of administration.

(4) Notwithstanding the provisions of this paragraph, the packing group of a tear gas substance is as assigned in Column 5 of the § 172.101 Table.

§ 173.134 Class 6, Division 6.2—Definition.

(a) For the purpose of this subchapter—

(1) An "infectious substance" (Division 6.2) means a viable microorganism, or its toxin, which causes or may cause human disease, and is limited to those agents listed in 42 CFR 72.3 of the regulations of the Department of Health and Human Services. The terms "infectious substance" and "etiologic agent" are synonymous.

(2) A "diagnostic specimen" means any human or animal material including, but not limited to, excreta, secreta, blood, and its components, tissue, and tissue fluids, being shipped for purposes of diagnosis.

(3) A "biological product" means a material prepared and manufactured in accordance with the provisions of 9 CFR Part 102 (Licensed veterinary biological products), 21 CFR Part 601 (Licensing), 21 CFR 312.1 (Conditions for exemption of new drugs for investigational use), 9 CFR Part 103 (Biological products for experimental treatment of animals), or 21 CFR 312.9 (New drugs for investigational use in laboratory research animals or in vitro tests), and which in accordance with these provisions, may be shipped in interstate commerce.

(b) The requirements of this subpart supplement the requirements of the Department of Health and Human Services contained in 42 CFR Part 72.

(c) Packing groups are not assigned to Division 6.2 materials.

§ 173.136 Class 8—Definitions.

(a) For the purpose of this subchapter, "corrosive material" (Class 8) means a liquid or solid that causes visible destruction or irreversible alterations in human skin tissue at the site of contact, or a liquid that has a severe corrosion rate on steel or aluminum, in accordance with the following criteria:

(1) A material is considered to be destructive or to cause irreversible alteration in human skin tissue if, when

tested on the intact skin of an albino rabbit by the technique described in Appendix A to this part, the structure of the tissue at the site of contact is destroyed or changed irreversibly after an exposure period of 4 hours or less.

(2) A liquid is considered to have a severe corrosion rate if its corrosion rate exceeds 6.25 mm (0.246 inches) a year on steel (SAE 1020) or aluminum (nonclad 7075–T6) at a test temperature of 55 °C (131 °F). An acceptable test is described in NACE Standard TM–01–69.

(b) If human experience or other data indicate that the hazard of a material is greater or less than indicated by the results of the tests specified in paragraph (a) of this section, the Department may revise its classification or make the material subject to the requirements of this subchapter.

§ 173.137 Class 8—Assignment of packing group.

(a) The packing group of Class 8 material is as indicated in Column 5 of the § 172.101 Table. When the § 172.101 Table provides more than one packing group for a hazardous material, the packing group shall be determined by applying the following criteria:

(i) *Packing Group I.* Substances that cause visible necrosis of the skin tissue at the site of contact when tested on the intact skin of an animal for a period of not more than 3 minutes.

(ii) *Packing Group II.* Substances that cause visible necrosis of the skin tissue at the site of contact when tested on the intact skin of an animal for a period of more than 3 minutes but not more than 60 minutes.

(iii) *Packing Group III.* (1) Substances that cause visible necrosis of the skin tissue at the site of contact when tested on the intact skin of an animal for a period of not more than 4 hours.

(2) Substances with a corrosion rate on steel or aluminum surfaces exceeding 6.25 mm (0.246 inches) a year at a test temperature of 55 °C (131 °F).

§ 173.140 Class 9—Definitions.

(a) For the purpose of this subchapter, "miscellaneous hazardous material" (Class 9) means a material which presents a hazard during transport, but which is not included in any other hazard class. Included in this class is any material which has an anesthetic, noxious or other similar property which could cause extreme annoyance or discomfort to a flight crew member so as to prevent the correct performance of assigned duties.

§ 173.141 Class 9—Assignment of packing group.

The packing group of a Class 9 material is as indicated in Column 5 of the § 172.101 Table.

§ 173.144 Other Regulated Materials (ORM)—Definitions.

(a) For the purpose of this subchapter, "ORM–D material" means a material such as a consumer commodity which, though otherwise subject to the regulations of this subchapter, presents a limited hazard during transportation due to its form, quantity and packaging. It must be a material for which exceptions are provided in the § 172.101 Table. Each ORM–D material or category of ORM–D material is listed in the § 172.101 Table.

(b) For the purpose of this subchapter, "ORM–E material" means a material that is not included in any other hazard class, but is subject to the requirements of this subchapter because it meets the definition in § 171.8 of this subchapter for a hazardous substance or a hazardous waste.

§ 173.145 Other Regulated Materials—Assignment of packing group.

(a) The packing group of an ORM–E material is as indicated in Column 5 of the § 172.101 Table.

(b) Packing groups are not assigned to ORM–D materials.

§ 173.150 Exceptions for Class 3 (flammable and combustible liquids).

(a) *General.* Exceptions for hazardous materials shipments in the following paragraphs are permitted only if this section is referenced for the specific hazardous material in the § 172.101 Table of this subchapter and the material does not meet the definition of another hazard class.

(b) *Limited quantities.* Limited quantities of flammable liquids (Class 8) are excepted from labeling, unless offered or intended for transportation by aircraft, and the specification packaging requirements of this subchapter when packaged in combination packagings according to this paragraph. In addition, shipments of limited quantities are not subject to Subpart F (Placarding) of Part 172 of this subchapter. Each package must conform to the packaging requirements of Subpart B of this part and may not exceed 30 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For flammable liquids in Packing Group I, inner packagings not over 0.5 liters (0.53 quarts) net capacity each, packed in strong outer packagings;

(2) For flammable liquids in Packing Group II, inner packagings not over 1.0 liters (1.06 quarts) net capacity each, packed in strong outer packaging; and

(3) For flammable liquids in Packing Group III, inner packagings not over 4.0 liters (1.06 gallons) net capacity each, packed in strong outer packagings.

(c) *Consumer commodities.* A limited quantity which conforms to the provisions of paragraph (b) of this section and is a "consumer commodity" as defined in § 171.8 of this subchapter, may be renamed "Consumer commodity" and reclassed as ORM–D material. In addition to the exceptions provided by paragraph (b), shipments of ORM–D materials are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft, and are eligible for the exceptions provided in § 173.156.

(d) *Alcoholic beverages.* Alcoholic beverages (wine and distilled spirits as defined in 27 CFR 4.10 and 5.11) in packagings of four liters or less are not subject to the requirements of this subchapter.

(e) *Aqueous solutions of alcohol.* An aqueous solution containing 24 percent or less alcohol by volume may be considered to have a flash point no less than 38 °C (100 °F).

(f) *Combustible liquids.*

(1) Except for transportation by vessel or aircraft, a flammable liquid with a flash point at or above 38 °C (100 °F) may be reclassed as a combustible liquid.

(2) Unless otherwise stated for a specific material, the requirements in this subchapter do not apply to a material classed as a combustible liquid in a non-bulk packaging unless the combustible liquid is a hazardous substance or a hazardous waste.

(3) A combustible liquid that is a hazardous substance or a hazardous waste, in a non-bulk packaging, and a combustible liquid in a bulk packaging is not subject to the requirements of this subchapter except those pertaining to:

(i) Shipping papers, waybills, switching orders, and hazardous waste manifests;

(ii) Marking of packages;

(iii) Display of identification numbers on bulk packages;

(iv) Placarding of bulk packagings;

(v) Carriage aboard aircraft and vessels (for packaging requirements for transport by vessel see § 176.340 of this subchapter);

(vi) Reporting incidents as prescribed by §§ 171.15, 171.16 and 171.17 of this subchapter;

(vii) Packaging requirements of Subpart B of this part; and

(viii) The requirements of §§ 173.1, 173.24, 173.24a, 173.24b, 174.1, 177.804, 177.817, and 177.834 of this subchapter.

(4) A combustible liquid that is not a hazardous substance or a hazardous waste is not subject to the requirements of this subchapter if it is a mixture of one or more components that

(i) Have a flash point at or above 93.30 °C (200 °F),

(ii) Comprise at least 99 percent of the volume of the mixture, and

(iii) Is not offered for transportation or transported as a liquid at a temperature at or above its flash point.

§ 173.151 Exceptions for Division 4.1 (flammable solids).

(a) *General.* Exceptions for hazardous material shipments in the following paragraphs are permitted only if this section is referenced for the specific hazardous material in the § 172.101 Table of this subchapter.

(b) *Limited quantities of Division 4.1 flammable solids.* Limited quantities of flammable solids (Division 4.1) in Packing Groups II and III are excepted from labeling, unless offered or intended for transportation by aircraft, and the specification packaging requirements of this subchapter when packaged in combination packagings according to this paragraph. In addition, shipments of limited quantities are not subject to Subpart F (Placarding) of Part 172 of this subchapter. Each package must conform to the packaging requirements of Subpart B of this part and may not exceed 30 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For flammable solids in Packing Group II, inner packagings not over 1.0 kilograms (2.20 pounds) net capacity each, packed in strong outer packagings; and

(2) For flammable solids in Packing Group III, inner packagings not over 5.0 kilograms (11.02 pounds) net capacity each, packed in strong outer packagings.

(c) *Consumer commodities.* A limited quantity which conforms to the provisions of paragraph (b) of this section, and charcoal briquettes in packagings not exceeding 30 kilograms (66.1 pounds) gross weight, may be renamed "Consumer commodity" and reclassed as ORM–D material, if the material is a "consumer commodity" as defined in § 171.8 of this subchapter. In addition to the exceptions provided by paragraph (b), shipments are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft, and are eligible for the exceptions provided in § 173.156.

§ 173.152 Exceptions for Division 5.1 (oxidizers) and Division 5.2 (organic peroxides).

(a) *General.* Exceptions for hazardous materials shipments in the following paragraphs are permitted only if this section is referenced for the specific hazardous material in the § 172.101 Table of this subchapter.

(b) *Limited quantities.* Limited quantities of oxidizers (Division 5.1) and organic peroxides (Division 5.2) in Packing Groups II and III are excepted from labeling, unless offered or intended for transportation by aircraft, and the specification packaging requirements of this subchapter when packaged in combination packagings according to this paragraph. In addition, shipments of these limited quantities are not subject to Subpart F of Part 172 (Placarding) of this subchapter. Each package must conform to the packaging requirements of Subpart B of this part and may not exceed 30 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For oxidizers in Packing Group II, inner packagings not over 1.0 liters (1.06 quarts) net capacity each for liquids or not over 1.0 kilograms (2.20 pounds) net capacity each for solids, packed in strong outer packagings.

(2) For oxidizers in Packing Group III, inner packagings not over 4.0 L (1.06 gallons) net capacity each for liquids or not over 5.0 kilograms (11.02 pounds) net capacity each for solids, packed in strong outer packagings.

(3) For organic peroxides in Packing Groups II and III, inner packagings not over 30 milliliter (1.0 ounce) net capacity for liquids or 30 grams (1.1 ounces) net capacity for solids, packed in strong outer packagings.

(c) *Consumer commodities.* A limited quantity which conforms to the provisions of paragraph (b) of this section and is a "consumer commodity" as defined in § 171.8 of this subchapter, may be renamed "Consumer commodity" and reclassed as ORM–D material. In addition to the exceptions provided by paragraph (b) of this section, shipments are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft, and are eligible for the exceptions provided in § 173.156.

§ 173.153 Exceptions for Division 6.1 (poisonous materials).

(a) *General.* Exceptions for hazardous material shipments in the following paragraphs are permitted only if this section is referenced for the specific hazardous material in the § 172.101 Table of this subchapter.

(b) *Limited quantities of Division 6.1 materials.* Limited quantities of poisonous materials (Division 6.1) in Packing Group III are excepted from the specification packaging requirements of this subchapter when packaged in combination packagings according to this paragraph. In addition, shipments of these limited quantities are not subject to Subpart F of Part 172 (Placarding) of this subchapter. Each package must conform to the packaging requirements of Subpart B of this part and may not exceed 30 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For poisonous liquids, inner packagings not over 4.0 liters (1.06 gallons) net capacity each, packed in strong outer packagings; and

(2) For poisonous solids, inner packagings not over 5.0 kilograms (11.02 pounds) net capacity each, packed in strong outer packagings.

(c) *Consumer commodities.* The following provisions apply to consumer commodities:

(1) A limited quantity which conforms to the provisions of paragraph (b) of this section and is a "consumer commodity" as defined in § 171.8 of this subchapter, may be renamed "Consumer commodity" and reclassed as ORM–D material.

(2) A poisonous material which is a drug or medicine and is a "consumer commodity" as defined in § 171.8 of this subchapter, may be renamed "Consumer commodity" and reclassed as ORM–D material if packaged in a combination packaging not exceeding 30 kilograms (66.1 pounds) with inner packagings not over 250 milliliters (8.5 ounces) net capacity for liquids or 250 grams (8.8 ounces) net capacity for solids packed in strong outer packagings. Each package must conform to the packaging requirements of Subpart B of this part.

(3) Packages of ORM–D material are excepted from the specification packaging requirements of this subchapter and from the labeling requirements of Subpart E of Part 172. Shipments of ORM–D material are eligible for the exceptions provided in § 173.156 and in paragraph (b) of this section and are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft.

§ 173.154 Exceptions for Class 8 (corrosive materials).

(a) *General.* Exceptions for hazardous materials shipments in the following paragraphs are permitted only if this section is referenced for the specific

hazardous material in the § 172.101 Table of this subchapter.

(b) *Limited quantities.* Limited quantities of corrosive materials (Class 8) in Packing Groups II and III are excepted from labeling, unless offered or intended for transportation by aircraft, and the specification packaging requirements of this subchapter when packaged in combination packagings according to this paragraph. In addition, shipments of these limited quantities are not subject to Subpart F (Placarding) of Part 172 of this subchapter. Each package must conform to the packaging requirements of Subpart B of this part and may not exceed 30 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For corrosive materials in Packing Group II, in inner packagings not over 1.0 liters (1.06 quarts) net capacity each for liquids or not over 1.0 kilograms (2.2 pounds) net capacity each for solids, packed in strong outer packagings.

(2) For corrosive materials in Packing Group III, in inner packagings not over 4.0 liters (1.06 gallons) net capacity each for liquids or not over 5.0 kilograms (11.02 pounds) net capacity each for solids, packed in strong outer packagings.

(c) *Consumer commodities.* A limited quantity which conforms to the provisions of paragraph (b) of this section and is a "consumer commodity" as defined in § 171.8 of this subchapter may be renamed "Consumer commodity" and reclassed as ORM–D material. In addition to the exceptions provided by paragraph (b) of this section, shipments of ORM–D materials are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft, and are eligible for the exceptions provided in § 173.156.

(d) *Materials corrosive to aluminum.* Except for a hazardous substance or a hazardous waste, a material classed as a Class 8, Packing Group III, material solely because of its corrosive effect on aluminum is not subject to the provisions of this subchapter when transported by motor vehicle or rail car.

§ 173.155 Exceptions for Class 9 (miscellaneous hazardous materials).

(a) *General.* Exceptions for hazardous materials shipments in the following paragraphs are permitted only if this section is referenced for the specific hazardous material in the § 172.101 Table of this subchapter.

(b) *Limited quantities.* Limited quantities of miscellaneous hazardous materials (Class 9) are excepted from the specification packaging requirements of this subchapter when packaged in combination packagings according to this paragraph. In addition, shipments of these limited quantities are not subject to Subpart F (Placarding) of Part 172 of this subchapter. Each package must conform to the packaging requirements of Subpart B of this part and may not exceed 30 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For liquids, inner packagings not over 4.0 liters (1.06 gallons) net capacity each, packed in strong outer packagings.

(2) For solids, inner packagings not over 5.0 kilograms (11.02 pounds) net capacity each, packed in strong outer packagings.

(c) *Consumer commodities.* A limited quantity which conforms to the provisions of paragraph (b) of this section and is a "consumer commodity" as defined in § 171.8 of this subchapter, may be renamed "Consumer commodity" and reclassed as ORM–D material. In addition to the exceptions provided by paragraph (b) of this section, shipments of ORM–D materials are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft, and are eligible for the exceptions provided in § 173.156.

§ 173.156 Exceptions for ORM materials.

(a) *General.* Exceptions for hazardous materials shipments in the following paragraphs are permitted only if this section is referenced for the specific hazardous material in the § 172.101 Table or in a packaging section in this part.

(b) *ORM–D.* Packagings for ORM–D materials are specified according to hazard class in §§ 173.150 through 173.155 and in § 173.306. In addition to other exceptions specified for ORM–D materials in this part, strong outer packagings as specified in this part and the marking requirements specified in § 172.316 of this subchapter are not required for materials classed as ORM–D when unitized in cages, carts or similar overpacks and when transported by a private or contract motor carrier from a distribution center to a retail outlet.

(c) *ORM–E.* Limited quantities of ORM–E materials are excepted from the specification packaging requirements of this subchapter when packaged according to this paragraph. Each package must conform to the packaging requirements of Subpart B of this part and may not exceed 30 kilograms (66.1 pounds) gross weight. The following combination packagings are authorized:

(1) For liquids, inner packagings not over 4.0 liters (1.06 gallons) net capacity each, packed in strong outer packagings; and

(2) For solids, inner packagings not over 5.0 kilograms (11.02 pounds) net capacity each, packed in strong outer packagings.

Subpart E—Non-bulk Packaging for Hazardous Materials Other Than Class 1 and Class 7

§ 173.158 Nitric Acid.

(a) Nitric acid exceeding 40 percent concentration may not be packaged with any other material.

(b) Nitric acid in any concentration which does not contain sulfuric acid or hydrochloric acid as impurities, when offered for transportation by rail, highway, or water shall be packaged in specification containers as follows:

(1) 1A1 stainless steel drums are authorized, subject to the following limitations:

(i) Stainless steel used in drums must conform to the following thicknesses:

Nominal (marked) capacity (in liters) of 1A1 Drum	Minimum thickness (in millimeters) of stainless steel
55	0.9
115	1.2
210	1.5
450	2.0

(ii) Drums weighing less than 85 percent of their original tare weight may not be used.

(iii) Type 304 or other grades of equivalent corrosion-resistant steels in the as-welded condition are permissible for nitric acid concentrations up to and including 78 percent.

(iv) For all concentrations of nitric acid, the following are permissible:

(A) Type 304 heat-treated (quenched in water at 1900 °F), or

(B) Stabilized Type 347 in the as-welded condition, or

(C) Stabilized Type 347 stress-relieved (1550–1650 °F), or

(D) Stabilized Type 347 heat-treated (quenched in water at 1900 °F), or

(E) Other grades of equivalent corrosion resistance.

(v) All parts of drum exposed to lading must be capable of withstanding the corrosive effect of nitric acid to the extent that 65 percent boiling nitric acid does not penetrate the metal more than 0.0381 mm (0.0015 inches) per month. (ASTM A 262 may be used for a suitable corrosion test procedure.)

(vi) In addition to marking required by § 178.503 of this subchapter, the following marks, in lettering of at least

½ inch (12.7 mm) height, must be placed on drums used to transport nitric acid:

(A) The type of steel used in body and head sheets as identified by American Iron and Steel Institute type number, and, in addition, the letters HT following the steel designation on containers subject to stress relieving or heat treatment during manufacture.

(B) The thickness in millimeters of metal in thinnest part. When the thickness of metal in the body differs from that in the head, both must be indicated with slanting line between and with the gauge of the body indicated first.

(C) Original tare weight in kilograms, preceded by the letters "TW."

An example of the markings required by paragraphs (b)(1)(vi) (A), (B), and (C) of this section is "304HT/1.9/2.7/TW55."

(2) 4H1 expanded plastics outer packagings with glass inner receptacles of not greater than 2.5 liters (2.64 quarts) capacity each. No more than four 2.5 liter inner receptacles may be packed in one outer packaging.

(c) Nitric acid of 80 percent or greater concentration which does not contain sulfuric acid or hydrochloric acid as impurities, when offered for transportation by rail, highway, or water may be packaged in 1B1 aluminum drums.

(d) Nitric acid of 90 percent or greater concentration, when offered for transportation by rail, highway, or water may be packaged in 4CI, 4C2, 4D or 4F wooden boxes with inner packagings consisting of glass bottles further individually overpacked in tightly closed metal packagings. Glass bottles must be of 2.5 liters (2.64 quarts) or less capacity and cushioned within the metal packagings.

(e) Nitric acid of less than 90 percent concentration, when offered for transportation by rail, highway, or water may be packaged in 4CI, 4C2, 4D or 4F wooden boxes with inside glass packagings of not over 2.5 liters (2.64 quarts) capacity each.

(f) Nitric acid of 70 percent or less concentration, when offered for transportation by rail, highway, or water, may be packaged as follows:

(1) In composite packagings 6PA1, 6PA2, 6PB1, 6PB2, 6PC, 6PD1, 6PH1, or 6PH2.

(2) In 4H1 expanded plastic boxes with inner glass packagings of not over 2.5 liters (2.64 quarts) each. 1(g) Nitric acid of more than 70 percent concentration, when offered for transportation by cargo aircraft only, must be packaged in combination packagings with 1A2, 1B2, 1D, 1G, 1H2, 3H2, 4C1, 4C2, 4D, 4F or 4G outer packagings with glass or earthenware inner packagings of not over one liter (2.11 pints) or glass ampoules of not over 0.5 liter (1.06 pints).

(h) Nitric acid of less than 70 percent concentration, when offered for transportation in cargo aircraft only must be packaged in combination packagings with 1A2, 1B2, 1D, 1G, 1H2, 3H2, 4CI, 4C2, 4D, 4F or 4G outer packagings with inner packagings of—

(1) Glass or earthenware not over 2.5 liter (2.64 quarts) capacity;

(2) Plastic not over 2.5 liter (2.64 quarts) capacity; or

(3) Glass ampoule not over 0.5 liter (1.06 pints) capacity.

§ 173.159 Batteries, wet.

(a) Electric storage batteries, containing electrolyte acid or alkaline corrosive battery fluid, must be completely protected so that short circuits will be prevented; they may not be packed with other materials except as provided in §§ 173.220 and 173.222 of this part and paragraphs (h) and (i) of this section.

(b) The following specification packagings are authorized for batteries packed without other materials:

(1) 4C1, 4C2, 4D, or 4F wooden boxes.

(2) 4G fiberboard boxes.

(c) The following non-specification packagings are authorized for batteries packed without other articles:

(1) Electric storage batteries protected against short circuits and firmly secured to skids or pallets capable of withstanding the shocks normally incident to transportation, are authorized for transportation by rail, highway, or water. The height of the completed unit must not exceed 1½ times the width of the skid or pallet. The unit must be capable of withstanding, without damage, a superimposed weight equal to two times the weight of the unit or, if the weight of the unit exceeds 2000 pounds (907.2 kg), a superimposed weight of 4000 pounds (1814.4 kg). Battery terminals must not be relied upon to support any part of the superimposed weight.

(2) Electric storage batteries weighing 500 pounds (226.8 kg) or more, consisting of carriers' equipment, may be shipped by rail when mounted on suitable skids and protected against short circuits. Such shipments must not be offered in interchange service.

(3) One to three batteries not over 25 pounds (11.3 kg) each packed in outer boxes. The maximum authorized gross weight is 75 pounds (34.0 kg).

(4) Not more than four batteries not over 15 pounds (6.8 kg) each, packed in strong outer fiberboard or wooden boxes. Batteries must be securely cushioned and packed to prevent short circuits. The maximum authorized gross weight is 65 pounds (29.5 kg).

(5) Not more than five batteries not over 10 pounds (4.5 kg) each, packed in strong outer fiberboard or wooden boxes. Batteries must be securely cushioned and packed to prevent short circuits. The maximum authorized gross weight is 65 pounds (29.5 kg).

(6) Single batteries not exceeding 75 pounds (34.0 kg) each, packed in 5-sided slip covers or in completely closed fiberboard boxes. Slip covers and boxes must be of solid or double-faced corrugated fiberboard of at least 200 pounds (9.07 kg) Mullen test strength. The slip cover or fiberboard box must fit snugly and provide inside top clearance of at least ½ inch (1.27 cm) above battery terminals and filler caps with reinforcement in place. Assembled for shipment, the bottom edges of the slipcover must come to within one inch (2.54 cm) of the bottom of the battery. The completed package (battery and box or slip cover) must be capable of withstanding a top-to-bottom compression test of at least 500 pounds (226.8 kg) without damage to battery terminals, cell covers or filler caps.

(d) Nonspillable wet electric storage batteries capable of withstanding the following two tests without leakage of battery fluid are excepted from all other requirements of this subchapter when protected against short circuits and securely packaged:

(1) *Vibration test.* The battery must be rigidly clamped to the platform of a vibration machine and a simple harmonic motion having an amplitude of 0.8 mm (0.03 inches), with a 1.6 mm (0.06 mm) maximum total excursion must be applied. The frequency must be varied at the rate of 1 Hz/min between the limits of 10 Hz to 55 Hz. The entire range of frequencies and return must be traversed in 95±5 minutes for each mounting position (direction of vibrator) of the battery. The battery must be tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for equal time periods.

(2) *Pressure differential test.* Following the vibration test, the battery must be stored for six hours at 24 °C+4 °C (75.2 °F+7.2 °F) while subjected to a pressure differential of at least 88 kPa (12.8 psi). The battery must be tested in three mutually perpendicular positions (to include testing with fill openings and vents, if any, in an inverted position) for at least six hours in each position.

(e) Electric storage batteries containing electrolyte or corrosive battery fluid are not subject to the requirements of this subchapter for

carriage by highway or rail if all of the following requirements are met:

(1) No other hazardous materials may be transported in the same vehicle,

(2) The batteries must be loaded or braced so as to prevent damage and short circuits in transit,

(3) Any other material loaded in the same vehicle must be blocked, braced, or otherwise secured to prevent contact with or damage to the batteries, and

(4) The transport vehicle may not carry material shipped by any person other than the shipper of the batteries.

(f) Electric storage batteries, containing electrolyte or corrosive battery fluid in a coil from which it is injected into the battery cells by a gas generator and initiator assembled with the battery, and which are nonspillable under the criteria of paragraph (d) of this section, are excepted from other requirements of this subchapter when examined by the Bureau of Explosives and approved by the Director, OHMT.

(g) Electrolyte, acid, or alkaline corrosive battery fluid, packed with storage batteries wet or dry, must be packed in one of the following specification packagings:

(1) In 4C1, 4C2, 4D, or 4F wooden boxes with inner receptacles of glass, not over 4.0 liters (1.06 gallons) each nor over 8.0 liters (2.11 gallons) total in each outside container. Inside containers must be well-cushioned and separated from batteries by a strong solid wooden partition. The completed package must conform to Packing Group III requirements.

(2) Electrolyte, acid, or alkaline corrosive battery fluid included with storage batteries and filling kits may be packed in strong plywood or wooden boxes when shipments are made by, for, or to the Departments of the Army, Navy, or Air Force of the United States. Packagings must conform to military specifications. The electrolyte, acid, or alkaline corrosive battery fluid must be packed in polyethylene bottles of not over 1.0 liter (1.06 quarts) capacity each. Not more than 24 bottles, securely separated from storage batteries and kits, may be shipped in each package.

(3) In 4C fiberboard boxes with not more than 12 inside packagings of polyethylene or other material resistant to the lading, each not over 2.0 liters (2.11 quarts) capacity each. Completed packages must conform to Packing Group III requirements. Inner packagings must be adequately separated from the storage battery. The maximum authorized gross weight is 65 pounds (29.5 kg). These packages are not authorized for transportation by aircraft.

(h) Dry storage batteries or battery charger devices may be packaged in 4G fiberboard boxes with inner receptacles containing battery fluid. Completed packagings must conform to Packing Group III requirements. Not more than 12 inner receptacles may be packed in one outer box. The maximum authorized gross weight is 75 pounds (34.0 kg).

§ 173.160 Bombs, smoke, non-explosive (corrosive).

Bombs, smoke, non-explosive, may be shipped provided they are without ignition elements, bursting charges, detonating fuses or other explosive components. They must be packaged in wooden (4C1, 4C2), plywood (4D) or reconstituted wood (4F) boxes, or plywood drums (1D), which meet Packing Group II requirements.

§ 173.161 Chemical kits.

(a) Except as otherwise provided, chemical kits must be packed, marked, and labeled as prescribed by this subchapter for the specific corrosive materials contained therein.

(b) Chemical kits containing limited quantities of corrosive liquids in inner receptacles of not over 6 fluid ounces (177.4 mL) capacity each are excepted from labeling (except when offered for transportation by air) and the specification packaging requirements of this subchapter if all of the following requirements are met:

(1) The kit may contain only corrosive liquids for which packaging exceptions are provided in the § 172.101 Table.

(2) The kit must be a strong wooden or metal outer packaging, or must be packed in a strong wooden or metal packaging.

(3) The corrosive liquids must be cushioned with sufficient absorbent material to completely absorb the contents of the individual containers, and must be protected from damage by other materials in the kit.

(4) The contents of the kit must be of a nature and packed so there will be no possibility of the mixture of contents causing dangerous evolution of heat or gas.

In addition, these shipments are not subject to Subpart F of Part 172 of this subchapter (Placarding), to Part 174 (Carriage by rail) of this subchapter except § 174.24 (Shipping papers) and to Part 177 (Carriage by highway) of this subchapter except § 177.817 (Shipping papers).

(c) Except as provided in paragraph (b) of this section, chemical kits must be packed in 4G fiberboard boxes with inner glass receptacles of not over one liter (1.06 quart) capacity each, securely cushioned and separated from other inside containers. The contents of the kit must be of such a nature and so packed that there will be no possibility of the mixture of contents causing dangerous evolution of heat or gas.

§ 173.162 Gallium.

Gallium metal must be packaged in packagings intended to contain liquids consisting of semi-rigid plastic inner packagings of not more than 2.5 kg (5.51 pounds) net capacity each, individually enclosed in a sealed leak-tight bag of strong puncture-resistant material. The sealed bags must be packed in wooden (4C1, 4C2), plywood (4D), reconstituted wood (4F), fiberboard (4G) or plastic (4H1, 4H2) boxes or in fiber (1G) or steel (1A2) drums, which are lined with leak-tight, puncture-resistant material. Bags and liner material must be chemically resistant to gallium. If it is desired to maintain the gallium in a completely solid state, the above packaging may be overpacked in a strong, water-resistant outer packaging which contains dry ice or other means of refrigeration. If a refrigerant is used, all of the above materials used in the packaging of gallium must be chemically and physically resistant to the refrigerant and must have impact resistance at the low temperatures of the refrigerant employed. If dry ice is used, the outer packaging must permit the release of carbon dioxide gas. Completed packaging must meet Packing Group I requirements for transportation by aircraft and Packing Group III requirements for transportation by vessel.

§ 173.163 Hydrogen fluoride.

Hydrogen fluoride (hydrofluoric acid, anhydrous) must be shipped in Specification 3, 3A, 3AA, 3B, 3C, 3E, 4, 4A, 25, or 38 cylinders; or Specification 4B, 4BA, 4BW or 4C cylinders, if they are not brazed. Filling density must not exceed 85 percent of the water weight capacity of the cylinder. Cylinders used exclusively in this service may, in lieu of the periodic hydrostatic retest required by § 173.34(e), be given a complete external visual inspection as described in CGA Pamphlet C–6, at the time such periodic retest becomes due. Such inspections shall be made on cylinders cleaned to bare metal. The results shall be recorded on a data sheet, completed copies of which shall be kept as prescribed in § 173.34(e)(5). Items which must be checked and recorded on these data sheets are: Date of inspection (month and year); DOT specification number; cylinder identification (registered symbol and serial number, date of manufacture, and if needed for adequate identification, ownership symbol); tare weight; physical condition

(record specifically any leakage, corrosion, gouges, dents or digs in shell or heads, broken or damaged footring or protective ring or fire damage); disposition of cylinders (returned to service, to cylinder manufacturer for repairs, or scrapped). A cylinder which passes the inspection prescribed shall have the data recorded in the manner presently prescribed for the recording of the retest date except that an "E" is to follow the date (month and year) indicating requalification by the external inspection method. Cylinders removed from this service for any reason must be rendered unfit for any other regulated service.

§ 173.164 Mercury (metallic and articles containing mercury).

(a) Metallic mercury must be packaged as follows:

(1) In earthenware or glass or suitable plastic inner packagings of not more than 250 mL (8.5 ounces) capacity each, packed in steel drums (1A2), steel jerricans (3A2), wooden (4C1, 4C2), plywood (4D), fiberboard (4G) or reconstituted wood (4F) boxes, plywood drums (1D) or fiber drums (1G) with sufficient cushioning material to prevent breakage. Either the inner packagings or the outer packagings must have inner linings or bags of strong leakproof and puncture-resistant material impervious to mercury, completely surrounding the contents, which will prevent the escape of mercury from the package irrespective of its position.

(2) Iron or steel "quicksilver flasks" packaged in steel drums (1A2), steel jerricans (3A2), wooden (4C1, 4C2), plywood (4D), fiberboard (4G) or reconstituted wood (4F) boxes, plywood drums (1D) or fiber drums (1G) with leakproof linings as in subparagraph (1) of this paragraph.

(3) In welded steel bottles with inner vaulted bottoms as single packagings. The closure must be a bolt with a conical thread, and the opening must not exceed 20 mm (0.8 inch). The maximum net mass must not exceed 35 Kg (77.2 pounds).

(b) Manufactured articles or apparatuses containing mercury are excepted from the specification packaging requirements of this subchapter, when packaged as follows:

(1) Manufactured articles or apparatuses of which metallic mercury is a component part, such as manometers, pumps, thermometers, switches, etc. (for electron tubes, mercury vapor tubes and similar tubes, see paragraph (b)(2) of this section), must be in strong outer packagings, having sealed inner liners or bags of strong leakproof and puncture-resistant material impervious to mercury, which will prevent the escape of mercury from the package irrespective of its position. Mercury switches and relays are excepted from these requirements, if they are of the totally enclosed leakproof type in sealed metal or plastic units. Thermometers, switches and relays, each containing a total quantity of not more than 15 g (0.5 ounce) of mercury, are also excepted if installed as an integral part of a machine or apparatus and so fitted that shock of impact damage, leading to leakage of mercury, is unlikely to occur under conditions normally incident to transport;

(2) Electron tubes, mercury vapor tubes and similar tubes must be packaged as follows:

(i) Tubes which are packed in strong outer packagings with all seams and joints sealed with self-adhesive, pressure-sensitive tape which will prevent the escape of mercury from the package, are authorized up to a total net quantity of 450 g (15.9 ounces) of mercury per package;

(ii) Tubes with more than 450 g (15.9 ounces) of mercury are authorized only when packed in strong outer packagings, having sealed inner liners or bags of strong leakproof and puncture-resistant material impervious to mercury which will prevent escape of mercury from the package irrespective of its position;

(iii) Tubes which do not contain more than 5 g (0.2 ounce) of mercury each and which are packed in the manufacturer's original packagings, are authorized up to a total net quantity of 30 g (1.1 ounces) of mercury per package;

(iv) Tubes which are completely jacketed in sealed leakproof metal cases are authorized in the manufacturer's original packagings;

(3) For electron tubes, mercury vapor tubes, and similar tubes, the shipper must indicate the quantity of mercury on the shipping paper.

(4) Mercurial barometers conforming to subparagraph (1) of this paragraph, which are loaded and unloaded from an aircraft under the supervision of, and accompanied in flight by, a National Weather Service official or similar United States agency official, are excepted from any other requirements of this subchapter.

§ 173.171 Smokeless powder for small arms.

Smokeless powder for small arms may be classed as a flammable solid, for transportation by highway and rail only, subject to the following conditions:

(a) The smokeless powder must be examined for this classification by the Bureau of Explosives and approved by the Director, OHMT;

(b) The total quantity of smokeless powder in one railcar or motor vehicle may not exceed 100 pounds (45.4 kg) net mass; and

(c) Only combination packagings with inner packagings not exceeding 8 pounds (3.6 kg) net mass are authorized. Inner packagings must be arranged and protected so as to prevent simultaneous ignition of the contents. The complete package must be a type examined by the Bureau of Explosives and approved by the Director, OHMT.

§ 173.172 Aircraft hydraulic power unit fuel tank.

(a) Aircraft hydraulic power unit fuel tanks containing a mixture of anhydrous hydrazine and monomethyl hydrazine (M86 fuel) and designed for installation as complete units in aircraft are excepted from the specification packaging requirements of this subchapter when they conform to either of the following conditions:

(1) The unit must consist of an aluminum pressure vessel made from tubing and having welded heads. Primary containment of the fuel within this vessel must consist of a welded aluminum bladder having a maximum internal volume of 46L (12.2 gallons). The outer vessel must have a minimum design gauge pressure of 1,275 kPa (184.9 psi) and a minimum burst gauge pressure of 2,755 kPa (399.48 psi). Each vessel must be leak-checked during manufacture and before shipment and must be found leakproof. The complete inner unit must be securely packed in non-combustible cushioning material, such as vermiculite, in a strong outer tightly closed metal packaging which will adequately protect all fittings. Maximum quantity of fuel per unit and package is 42L (11.1 gallons); or

(2) The unit must consist of an aluminum pressure vessel. Primary containment of the fuel within this vessel must consist of a welded hermetically sealed fuel compartment with an elastomeric bladder having a maximum internal volume of 46L (12.2 gallons). The pressure vessel must have a minimum design gauge pressure of 5,170 kPa (749.8 psi). Each vessel must be leak-checked during manufacture and before shipment and must be securely packed in non-combustible cushioning material, such as vermiculite, in a strong outer tightly closed metal packaging which will adequately protect all fittings. Maximum quantity of fuel per unit and package is 42L (11.1 gallons).

§ 173.173 Paint, paint-related material, adhesives and ink.

(a) Except as otherwise provided in this part, the description "Paint" is the proper shipping name for paint, lacquer, enamel, stain, shellac, varnish, liquid aluminum, liquid bronze, liquid gold, liquid wood filler, and liquid lacquer base. The description "Paint-related material" is the proper shipping name for a paint thinning, reducing or removing compound. However, if a more specific description is listed in the § 172.101 Table of this subchapter, that description must be used.

(b) Paint, paint-related material, adhesives and ink must be packaged as follows:

(1) As prescribed in § 173.202 of this Part if it is a Packing Group II material or § 173.203 of this Part if it is a Packing Group III material.

(2) In inner glass packagings of not over one liter capacity each or inner metal packagings of not over 5 liters each, packed in a strong outer packaging. Packages must conform to the packaging requirements of Subpart B of this part but need not conform to the requirements of Part 178 of this subchapter.

§ 173.174 Refrigerating machines.

A refrigerating machine assembled for shipment and containing 15 pounds (6.8 kg) or less of a flammable liquid for its operation in a strong, tight receptacle is excepted from labeling (except when offered for transportation by air) and the specification packaging requirements of this subchapter. In addition, shipments are not subject to Subpart F of Part 172 of this subchapter (Placarding), to Part 174 of this subchapter (Carriage by rail) except § 174.24 (Shipping papers) and to Part 177 (Carriage by highway) of this subchapter except § 177.817 (Shipping papers).

§ 173.180 Aircraft thrust devices.

(a) Aircraft thrust devices for assisted take-off and their igniters must be of a type examined by the Bureau of Explosives and approved by the Director, OHMT. They must be properly marked and must be shipped in an inoperable condition, and must be packaged as authorized in paragraph (b) of this section.

(b) Devices must be packed in outer wooden (4C1, 4C2), plywood (4D) or reconstituted wood (4F) boxes with one of the following inner packaging provisions:

(1) Aircraft thrust devices only;

(2) Igniters for aircraft thrust devices only packed in sealed metal inner packagings; or;

(3) Aircraft thrust devices together with igniters in same outer packaging provided igniters are packed separately. Igniters must be packed in strong inner packagings and then in separate sealed metal packagings.

§ 173.181 Pyrophoric materials (liquids).

When the § 172.101 Table specifies that a hazardous material be packaged under this section, only the following non-bulk packagings are authorized:

(a) Specification steel or nickel cylinders prescribed for any compressed gas except acetylene having a minimum design pressure of 175 psi (1206.6 kPa). Cylinders with valves must be:

(1) Equipped with steel valve protection caps or collars, unless overpacked; or

(2) Overpacked in a wooden box (4C1, 4C2, 4D or 4F); fiberboard box (4G), or plastic box (4H1 or 4H2). Cylinders must be secured to prevent movement in the box and, when shipped, must be so loaded that pressure relief devices remain in the vapor space of the cylinder. (See §§ 173.34(d)(7), 174.300(d) and 177.837(d) of this subchapter.)

(b) Wooden boxes (4C1, 4C2, 4D or 4F) or fiberboard boxes (4G) enclosing not more than four strong, tight metal cans with inner receptacles of glass or metal, not over one liter (1.06 quarts) capacity each, having positive screwcap closures adequately gasketed. Inner packagings must be cushioned on all sides with dry, absorbent, incombustible material in a quantity sufficient to absorb the entire contents. The strong, tight metal cans must be closed by positive means, not by friction.

(c) Steel drums (1A2) not exceeding 220 liters (58.1 gallons) capacity each with inner metal cans not over 4.0 liters (1.06 gallons) capacity each, constructed of not less than 28 gauge (0.0149 inch (0.3785 mm) nominal thickness) electro-coated tin plate closed by positive means, not friction.

(1) Inner packagings must have no opening exceeding 26 mm (1.0 inch) diameter and must be surrounded with incombustible cushioning material.

(2) Net quantity of pyrophoric liquids may not exceed two-thirds of the rated capacity of the outer drum. For example, a 220-liter (58.1 gallons) outer drum may contain no more than 147 liters (38.8 gallons) of pyrophoric liquids.

(3) Each layer of inner containers must be separated by a tin plate separator in addition to cushioning material.

§ 173.182 Barium azide—50 percent or more water wet.

Barium azide—50 percent or more water wet, must be packed in wooden boxes (4C1, 4C2, 4D, or 4F) or fiber drums (1G) with inner glass packagings not over 0.5 kg (1.1 pounds) capacity each. Packagings must have rubber stoppers wire tied for securement. If shipment is to take place at a time freezing weather is anticipated, a suitable antifreeze solution must be used to prevent freezing. Each packaging must conform to the requirements of Part 178 of this subchapter at the Packing Group I performance level.

§ 173.183 Nitrocellulose base film.

Films, nitrocellulose base, must be packaged in packagings conforming to the requirements of Part 178 of this subchapter at the Packing Group III performance level, as follows:

(a) In steel drums (1A2), aluminum drums (1B2), steel jerricans (3A2), wooden (4C1, 4C2), plywood (4D) or reconstituted wood (4F) boxes or plywood drums (ID) with each reel in a tightly closed metal can or strong cardboard or fiberboard inner packaging with cover held in place by adhesive tape or paper; or

(b) In fiberboard (4G) boxes or fiber drums (1G) with a single tightly closed metal can or strong cardboard or fiberboard inner packaging with cover held in place by adhesive tape or paper; authorized only for not over 600 m (1968.5 ft.) of film.

§ 173.184 Highway or rail fusee.

(a) A fusee is a device designed to burn at a controlled rate and to produce visual effects for signaling purposes. The composition of the fusee must be such that the fusee will not ignite spontaneously or undergo marked decomposition when subjected to a temperature of 75° C (167° F) for 48 consecutive hours.

(b) Fusees (highway and railway) must be packaged in steel drums (1A2), steel jerricans (3A2), wooden (4C1, 4C2), plywood (4D) or reconstituted wood (4F) boxes or in fiberboard boxes (4G), plywood (ID) or fiber (IG) drums. If the fusees are equipped with spikes, packagings must have reinforced ends to prevent penetration of spikes through the outer packagings; packages must be capable of passing drop test requirements (§ 178.603 of this subchapter), including at least one drop with spike in a downward position, and other requirements of Part 178 of this subchapter, at the Packing Group II performance level.

§ 173.185 Lithium batteries and cells.

(a) Except as provided in paragraphs (i) and (j) of this section, lithium cells and batteries, containing only metallic

lithium and vanadium pentoxide, manganese dioxide, monofluorographite, sulfur dioxide, lithium bromide salts, acetonitrile, propylene carbonate, thionyl chloride, sulphuryl chloride, chlorine poly-carbon monofluoride, lithium tetrachloroaluminate, lithium perchlorate, or lithium tetrafluoroborate, are authorized for transportation when packaged in accordance with paragraphs (b) through (g) of this section and tested in accordance with paragraph (h) of this section. Other types of lithium cells, batteries, and devices containing lithium batteries, must be transported by methods approved by the Director, OHMT.

(b) No cell may contain more than 12 grams (0.42 ounce) of lithium or lithium alloy.

(c) Each cell and battery must be equipped with an effective means of preventing external short circuits.

(d) Each cell and battery must incorporate a safety venting device or be designed in a manner that will preclude a violent rupture when subject to an incident in transportation, such as a dead short.

(e) Batteries containing cells or series of cells connected in parallel must be equipped with diodes to prevent reverse current flow.

(f) Except as provided in paragraph (j) of this section, cells or batteries may not be offered for transportation or transported if any cell has been discharged to the extent that the open circuit voltage is less than two volts or is less than ⅔ of the voltage of the fully charged cell whichever is less.

(g) Lithium cells and batteries must be packaged in packagings conforming to the requirements of Part 178 of this subchapter at the Packing Group II performance level, as follows:

(1) In strong inner fiberboard packagings containing not more than 500 grams (1.10 pounds) of lithium per inner packaging.

(2) For shipment by water, rail or highway, inner packagings must be packed within a wooden box (4C1, 4C2, 4D, or 4F), fiberboard box (4G), fiber drum (1G), or metal drum (1A2 or 1B2).

(3) For shipment by cargo-only aircraft, the inner packaging must be packed in a steel drum (1A2) with a gas tight gasket. The maximum gross weight of the package must not exceed 35 kg (77.16 pounds).

(4) When the outer packaging is a metal drum, inner packagings must be separated from each other and from the outer packaging by at least 25 mm (one inch) of non-combustible cushioning material.

(h) Lithium batteries and cells must be tested as follows:

(1) The cell or battery must be subjected to a thermal stability test at 75° C (167.0° F) for 48 hours and must show no evidence of distortion, leakage or internal heating. This test must be performed on at least 10 cells and 1 battery of each type taken from each week's production, or as otherwise approved by the Director, OHMT.

(2) Under application of a direct short, the cell or battery must be rendered inert, preferably without venting (through the use of internal fusing devices). If venting does occur, an open flame must be applied to the venting fumes to prove that an explosive condition does not exist. This test must be performed on at least 3 cells and 1 battery of each type taken from each week's production, or as otherwise approved by the Director, OHMT.

(3) Cells containing no more than 12 grams of lithium metal and also containing lithium molybdenum disulfide and lithium hexafluoroarsenate or vanadium pentoxide, polycarbonmonofluoride, manganese dioxide, titanium disulfide, thionyl chloride and lithium tetrachloroaluminate, lithium tetrafluorobonate or acetonitrile and sulfur dioxide, or thionyl chloride/bromine complex or sulfuryl chloride and chlorine which are hermetically sealed, and batteries constructed of such cells, are excepted from the tests in paragraphs (h)(1) and (h)(2) of this section and the requirement to use a 1A2 steel drum for transportation by cargo aircraft only as an outer packaging provided that:

(i) The outer packaging conforms to paragraph (g)(2) of this section; and

(ii) Prior to the first shipment, 10 cells or 4 batteries of each type to be offered for transportation, or as otherwise approved by the Director, OHMT, must be tested as follows, without showing any evidence of out-gassing, leakage, loss of weight or distortion:

(A) The cells or batteries must be stored for 6 hours at an absolute pressure of 11.6 kPa (1.68 psi) and a temperature of 24° C±4° C; (75.2° F±7.2° F).

(B) The cells or batteries must then be subjected to the thermal stability test at 75°C (167°F) for 48 hours as required in paragraph (h)(1) of this section;

(C) The cells or batteries must be rigidly clamped to the platform of a vibration machine. A simple harmonic motion having an amplitude of 0.8 mm (1.6 mm maximum total excursion) must be applied. The frequency must be varied at the rate of 1 Hz/min between the limits of 10 Hz to 55 Hz. The entire range of frequencies and return must be traversed in 95 ±5 minutes for each of three mutually perpendicular mounting positions of the battery and two perpendicular positions of the cells. One of the directions of vibration must be perpendicular to the terminal face of the battery or cell. Open circuit voltage must be observed for 30 seconds during the last quarter of each vibration period. Periodic retesting is not required;

(D) The battery must be secured to a shock testing machine by means of a rigid mount which will support all mounting surfaces of the battery. Each battery must be subjected to a total of three shocks of equal magnitude. The shocks must be applied in each of three mutually perpendicular directions. Each shock must be applied in a direction normal to a face of the battery. For each shock, the battery must be accelerated in such a manner that during the first 3 milliseconds the minimum average acceleration is 75 g (where g is the local acceleration due to gravity). The peak acceleration must be between 125 g and 175 g.

(i) Lithium batteries comprised of one or more cells are not subject to the requirements of this subchapter, if they meet the following requirements:

(1) Each cell may contain no more than 0.5 gram of lithium or lithium alloy.

(2) Each battery may contain an aggregate quantity of no more than 1 gram of lithium or lithium alloy.

(3) Each cell must be hermetically sealed.

(4) Cells must be separated so as to prevent short circuits.

(5) Batteries must be packed in strong outer packagers except when installed in electronic devices.

(6) If a battery contains more than 0.5 gram of lithium or lithium alloy, it may not contain a liquid or gas that is a hazardous material according to this subchapter unless the liquid or gas, if free, would be completely absorbed or neutralized by other materials in the battery.

(j) Lithium batteries, for disposal, comprised of one or more cells, may be offered for transportation to a permitted storage facility and disposal site by motor vehicle only, if the battery—

(1) When new, contained not more than 12.0 grams (0.42 ounce) of lithium per cell;

(2) Is equipped with an effective means of preventing external short circuits; and

(3) Is packed in a strong outer packaging conforming to the requirements of §§ 173.24 and 173.24a. The packaging need not conform to Part 178 performance requirements.

§ 173.186 Matches.

(a) Matches must be of a type which will not ignite spontaneously or undergo marked decomposition when subjected for 8 consecutive hours to a temperature of 93.3 °C (200 °F).

(b) *Definitions.* (1) "Fusee matches" are matches the heads of which are prepared with a friction sensitive igniter composition and a pyrotechnic composition which burns with little or no flame, but with intense heat.

(2) "Safety matches" are matches combined with or attached to the box, book or card that can be ignited by friction only on a prepared surface.

(3) "Strike anywhere" matches are matches that can be ignited by friction on a solid surface.

(4) "Wax 'Vesta' matches" are matches that can be ignited by friction either on a prepared surface or on a solid surface.

(c) Safety matches and wax "Vesta" matches must be tightly packed in securely closed inner packagings to prevent accidental ignition under conditions normally incident to transportation, and further packed in outer fiberboard, wooden, or other equivalent-type packagings. These matches in outer packagings not exceeding 50 pounds (22.7 kg) gross weight are not subject to any other requirement (except marking) of this subchapter. These matches may be packed in the same outer packaging with matdrials not subject to this subchapter.

(d) Strike anywhere matches may not be packed in the same outer packaging with any material other than safety matches or wax "Vesta" matches, which must be packed in separate inner packagings.

(e) *Packagings.* Strike anywhere matches must be tightly packed in securely closed chipboard, fiberboard, wooden, or metal inner packag ings to prevent accidental ignition under conditions normally incident to transportation. Each inner packaging may contain no more than 700 strike anywere matches and must be packed in outer steel drums (1A2), aluminum drums (1B2), steel jerricans (3A2), wooden (4C1, 4C2), plywood (4D), reconstituted wood (4F) or fiberboard (4G) boxes, plywood (1D) or fiber (1G) drums. Gross weight of fiberboard boxes (4G) must not exceed 60 pounds (27.2 kg). Gross weight of other outer packagings must not exceed 100 pounds (45.4 kg).

§ 173.187 Pyrophoric solids, metals or alloys, n.o.s.

Packings for pyrophoric solids, metals, or alloys, n.o.s. must conform to the requirements of Part 178 of this subchapter at the packing group performance level specified in the § 172.101 Table. These materials must be packaged as follows:

(a) In wooden boxes (4C1, 4C2, 4D, or 4F) with inner metal receptacles which have a positive (not friction) means of closure and contain not more than 15 kilograms (33.1 pounds) each.

(b) In steel drums (1A1 or 1A2) with a gross mass not exceeding 150 kg (330.7 pounds) per drum.

(c) In fiberboard boxes (4G) with inner metal receptacles which have a positive. (not friction) means of closure and contain not more than 7.5 kilograms (16.53 pounds) each.

(d) In fiber drums (1G) with inner metal receptacles which have a positive (not friction) means of closure and contain not more than 15 kilograms (33.1 pounds) each.

(e) In plywood drums (1D) with inner metal receptacles which have a positive (not friction) means of closure and contain not more than 15 kilograms (33.1 pounds) each.

§ 173.188 White or yellow phosphorus.

Phosphorus, white or yellow, when offered for transportation by rail, highway, or water, must be packaged in water or dry in packagings conforming to the requirements of Part 178 of this subchapter at the Packing Group I performance level, as follows:

(a) When placed in water, it must be packaged in specification packagings as follows:

(1) Wooden boxes (4C1, 4C2, 4D, or 4F) with:

(i) inner hermetically sealed (soldered) metal cans, enclosed in other hermetically sealed (soldered) metal cans, or

(ii) inner water-tight metal cans containing not over 0.5 kg (1.0 pounds) of phosphorus with screw-top closures.

(2) Metal drums (1A1 or 1A2), not over 115 liters (30.4 gallons) capacity each.

(b) When dry, it must be cast solid and shipped in packagings as follows:

(1) Metal drums (1A2) not over 115 liters (30.4 gallons) capacity each.

(2) In projectiles or bombs when shipped by, for, or to the Departments of the Army, Navy, or Air Force of the United States Government, without bursting elements.

§ 173.192 Packaging for certain Packing Group I poisonous materials.

When § 172.101 of this subchapter specifies that a poisonous material be packaged under this section, only specification cylinders are authorized, as follows:

(a) Specification 3A1800, 3AA1800, 3AL1800, or 3E1800 cylinders.

(i) Specification 3A, 3AA and 3AL cylinders must not exceed 125 pounds (56.7 kg) water capacity (nominal).

(ii) Specification 3AL cylinders containing arsine or phosphine may only be transported by highway and rail.

(b) Packagings must conform to the requirements of § 173.40 of this part.

(c) For cylinders used for phosgene, the filling density may not exceed 125 percent and a cylinder may not contain more than 150 pounds (68.0 kg) of phosgene.

§ 173.193 Bromoacetone, methyl bromide, chloropicrin and methyl bromide or methyl chloride mixtures, etc.

(a) Bromoacetone must be packaged as follows in wooden boxes (4C1, 4C2, 4D or 4F) with inner glass receptacles or tubes in hermetically sealed metal receptacles in corrugated fiberboard cartons. Bottles must not contain over 500 grams (1.1 pounds) of liquid each and be cushioned in cans with at least ½ inch (12.7 mm) of absorbent material. Total amount of liquid in outer box must not exceed 11 kg (24.3 pounds). Packagings must conform to the requirements of Part 178 of this subchapter at the Packing Group I performance level.

(b) Bromoacetone, methyl bromide, chloropicrin and methyl bromide mixtures, chloropicrin and methyl chloride mixtures, and chloropicrin mixtures charged with non-flammable, non-liquefied compressed gas must be packed in Specification 3A, 3AA, 3B, 3C 3E, 4A, 4B, 4BA, 4BW, or 4C cylinders having not over 250 pounds (113.4 kg) water capacity (nominal).

(c) Cylinders must conform to § 173.40.

§ 173.194 Gas identification sets.

Gas identification sets containing poisonous material must be packaged in packaging conforming to the requirements of Part 178 of this subchapter at the Packing Group I performance level, as follows:

(a) In glass inner receptacles, hermetically sealed, of not over 40 milliliters (1.35 fluid ounces) each. Each glass inner receptacle must in turn be placed in a sealed fiberboard receptacle, cushioned with absorbent material. Not more than 12 fiberboard receptacles must in turn be placed in a fiberboard box (4G). No more than four boxes, well-cushioned, must in turn be placed in a steel cylinder. The cylinder must have a wall thickness of at least 3.7 mm (0.146 inch) and must have a hermetically sealed steel closure.

(b) When the poisonous material is adsorbed in a medium such as activated charcoal or silical gel, gas identification sets may be shipped as follows:

(1) If the poisonous material does not exceed 5 milliliters (0.17 fluid ounce) if a liquid or 5 grams (0.18 ounce) if a solid, it may be packed in glass inner receptacles of not over 120 milliliters (4.1 fluid ounces) each. Each glass receptacle, cushioned with absorbent material must be packed in a hermetically sealed metal can of not less than 0.30 mm (0.0120 inch) wall thickness. Metal cans, surrounded on all sides by at least 25 mm (1 inch) of dry sawdust, must be packed in 4C1, 4C2, 4D or 4F wooden boxes. Not more than 100 milliliters (3.38 fluid ounces) or 100 grams (3.53 ounces) of poisonous materials may be packed in one outer wooden box.

(2) If the poisonous material does not exceed 5 milliliters (0.17 fluid ounce) if a liquid or 20 grams (0.7 ounce) if a solid, it may be packed in glass inner receptacles with screw-top closures of not less than 60 milliliters (2.02 fluid ounces), hermetically sealed. Twelve bottles containing poisonous material, not to exceed 100 milliliters, or grams, or both, may be placed in a plastic carrying case, each glass receptacle surrounded by absorbent cushioning and each separated from the other by sponge rubber partitions. The plastic carrying case must be placed in a tightly fitting fiberboard box which in turn must be placed in a tightly fitting 4C1, 4C2, 4D or 4F wooden box.

§ 173.195 Hydrocyanic acid, liquid (prussic acid) and hydrocyanic acid liquefied.

(a) Hydrocyanic acid, liquid (prussic acid) and hydrocyanic acid liquefied, must be packed in specification cylinders as follows:

(1) As prescribed in § 173.192, or

(2) Specification 3A480, 3AA480, or 3AL1800 metal cylinders of not over 126.08 kg (278 pounds) water capacity (nominal). Shipments in 3AL cylinders are authorized only when transported by highway and rail.

(b) Cylinders may not be charged with more than 0.27 kg (0.6 pound) of liquid per 0.45 kg (1 pound) water capacity of cylinder. Each filled cylinder must be tested for leakage before shipment and must show absolutely no leakage; this test must consist in passing a piece of Guignard's sodium picrate paper over the closure of the cylinder, without the protection cap attached, to detect any escape of hydrocyanic acid from the cylinder. Other equally efficient test methods may be used if approved by the Director, OHMT.

(c) Packagings for hydrocyanic acid must conform to § 173.40.

§ 173.196 Infectious substances (etiologic agents).

(a) Authorized packagings and components are as follows:

(1) Inner packagings comprising:

(i) A watertight primary receptacle;

(ii) A watertight secondary packaging; and

(iii) An absorbent material must be placed between the primary receptacle and the secondary packaging. If multiple-primary receptacles are placed in a single secondary packaging they must be wrapped individually to ensure that contact between them is prevented. The absorbent material, such as cotton wool, must be sufficient to absorb the entire contents of all primary receptacles.

(2) An outer packaging which is capable of withstanding the specification performance tests found in § 173.465 or § 173.466. Packages consigned as freight must be at least 100 mm (3.94 inches) in the smallest over all external dimension.

(b) For all packages containing infectious substances, an itemized list of contents must be enclosed between the secondary packaging and the outer packaging.

(c) Although exceptional cases, such as whole organs, may require special packaging, the great majority of infectious substances can and must be packaged according to the following guidelines.

(1) *Lypholized substances.* Primary receptacles include flame-sealed glass ampoules or rubber-stopped glass vials fitted with metal seals.

(2) *Liquid or solid substances.* (i) *Substances shipped at ambient temperatures or higher.* Primary receptacles include those of glass, metal or plastic. Positive means of ensuring a leakproof, seal, such as heat seal, skirted stopper or metal crimp seal must be provided. If screw caps are used, they must be reinforced with adhesive tape.

(ii) *Substances shipped refrigerated or frozen (ice, pre-frozen packs, dry ice).* Primary receptacles closed by screw caps must not be used. Ice or dry ice must be placed outside the secondary packagings(s). Interior supports must be provided to secure the secondary packagings(s) in the original position after the ice or dry ice has dissipated. If ice is used, the packaging must be leakproof. If dry ice is used, the outer packaging must permit the release of carbon dioxide gas.

(iii) *Substances shipped in liquid nitrogen.* Primary receptacles must be heat-sealed. Plastic capable of withstanding very low temperatures must be used instead of glass receptacles. Secondary packaging must also withstand very low temperatures and in most cases will need to be fitted over individual primary receptacles. Requirements for shipment of liquid nitrogen must also be observed.

(d) Whatever the intended temperature of shipment, the primary receptacle and secondary packaging used for infectious substances must be capable of withstanding, without leakage, an internal pressure which produces a pressure differential of not less than 95 kPa (13.8 psi) and temperatures in the range of −40 °C to +55 °C (−40 °F to +131 °F).

(e) The requirements of this section supplement the requirements of the Department of Health and Human Services contained in 42 CFR Part 72.

(f) *Exceptions.* The following substances are not subject to any requirements of this subchapter if the items as packaged do not contain any material otherwise subject to the requirements of this subchapter.

(1) Diagnostic specimens.

(2) Biological products.

(3) Cultures of etiologic agents of 50 milliliters (1.67 fluid ounces) or less total quantity in one outside package.

§ 173.198 Nickel carbonyl.

(a) Nickel carbonyl must be packed in specification steel or nickel cylinders as prescribed for any compressed gas except acetylene. A cylinder used exclusively for nickel carbonyl may be given a complete external visual inspection in lieu of the interior hydrostatic pressure test required by § 173.34(e). Visual inspection must be in accordance with CGA Pamphlet C–6.

(b) Packagings for nickel carbonyl must conform to § 173.40.

§ 173.201 Non-bulk packagings for liquid hazardous materials in Packing Group I.

(a) When § 172.101 of this subchapter specifies that a liquid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each packaging must conform to the general packaging requirements of Subpart B of Part 173, to the requirements of Part 178 at the Packing Group I performance level, and to the requirements of the special provisions of Column 7 of the § 172.101 Table.

(b) The following combination packagings are authorized:

Outer packagings:
Steel drum: 1A2

Aluminum drum: 1B2
Plywood drum: 1D
Fiber drum: 1G
Plastic drum: 1H2
Steel jerrican: 3A2
Plastic jerrican: 3H2
Steel box: 4A1 or 4A2
Aluminum box: 4B1 or 4B2
Natural wood box: 4C1 or 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Expanded plastic box: 4H1
Solid plastic box: 4H2
Inner packagings:
Glass or earthenware receptacles
Plastic receptacles
Metal receptacles
Glass ampoules

(c) Except for transportation by passenger aircraft, the following single packagings are authorized:

Steel drum: 1A1 or 1A2
Aluminum drum: 1B1 or 1B2
Metal drum other than steel or aluminum: 1N1 or 1N2
Plastic drum: 1H1 or 1H2
Steel jerrican: 3A1 or 3A2
Plastic jerrican: 3H1 or 3H2
Plastic receptacle in steel, aluminum, fiber or plastic drum: 6HA1, 6HB1, 6HG1, 6HH
Plastic receptacle in steel, aluminum, wooden, plywood or fiberboard box: 6HA2, 6HB2, 6HC, 6HD2 or 6HG2
Glass, porcelain or stoneware in steel, aluminum or fiber drum: 6PA1, 6PB1 or 6PG1
Glass, porcelain or stoneware in steel, aluminum, wooden or fiberboard box: 6PA2, 6PB2, 6PC or 6PG2
Glass, porcelain or stoneware in solid or expanded plastic packaging: 6PH1 or 6PH2
Cylinders, specification, as prescribed for any compressed gas, except for Specifications 8 and 3HT

§ 173.202 Non-bulk packagings for liquid hazardous materials in Packing Group II.

(a) When § 172.101 of this subchapter specifies that a liquid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each packaging must conform to the general packaging requirements of Subpart B of Part 173, to the requirements of Part 178 at the Packing Group I or II performance level (unless otherwise excepted), and to the particular requirements of the special provisions of Column 7 of the § 172.101 Table.

(b) The following combination packagings are authorized:

Outer packagings:
Steel drum: 1A2
Aluminum drum: 1B2
Plywood drum: 1D
Fiber drum: 1G
Plastic drum: 1H2
Wooden barrel: 2C2
Steel jerrican: 3A2
Plastic jerrican: 3H2
Steel box: 4A1 or 4A2
Aluminum box: 4B1 or 4B2
Natural wood box: 4C1 or 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Expanded plastic box: 4H1
Solid plastic box: 4H2

Inner packagings:
Glass or earthenware receptacles
Plastic receptacles
Metal receptacles
Glass ampoules

(c) Except for transportation by passenger aircraft, the following single packagings are authorized:

Steel drum: 1A1 or 1A2
Aluminum drum: 1B1 or 1B2
Metal drum other than steel or aluminum: 1N1 or 1N2
Plastic drum: 1H1 or 1H2
Wooden barrel: 2C1
Steel jerrican: 3A1 or 3A2
Plastic jerrican: 3H1 or 3H2
Plastic receptacle in steel, aluminum, fiber or plastic drum: 6HA1, 6HB1, 6HG1 or 6HH
Plastic receptacle in steel, aluminum, wooden, plywood or fiberboard box: 6HA2, 6HB2, 6HC, 6HD2 or 6HG2
Glass, porcelain or stoneware in steel, aluminum or fiber drum: 6PA1, 6PB1 or 6PG1
Glass, porcelain or stoneware in steel, aluminum, wooden or fiberboard box: 6PA2, 6PB2, 6PC or 6PG2
Glass, porcelain or stoneware in solid or expanded plastic packaging: 6PH1 or 6PH2
Plastic receptacle in plywood drum: 6HD1
Glass, porcelain or stoneware in plywood drum or wickerwork hamper: 6PD1 or 6PD2
Cylinders, specification, as prescribed for any compressed gas, except for Specifications 8 and 3HT

§ 173.203 Non-bulk packagings for liquid hazardous materials in Packing Group III.

(a) When § 172.101 of this subchapter specifies that a liquid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each packaging must conform to the general packaging requirements of Subpart B of Part 173, to the requirements of Part 178 at the Packing Group I, II or III performance level, and to the requirements of the special provisions of Column 7 of the § 172.101 Table.

(b) The following combination packagings are authorized:

Outer packagings:
Steel drum: 1A2
Aluminum drum: 1B2
Plywood drum: 1D
Fiber drum: 1G
Plastic drum: 1H2
Wooden barrel: 2C2
Steel jerrican: 3A2
Plastic jerrican: 3H2
Steel box: 4A1 or 4A2
Aluminum box: 4B1 or 4B2
Natural wood box: 4C1 or 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Expanded plastic box: 4H1
Solid plastic box: 4H2

Inner packagings:
Glass or earthenware receptacles
Plastic receptacles
Metal receptacles
Glass ampoules

(c) The following single packagings are authorized:

Steel drum: 1A1 or 1A2
Aluminum drum: 1B1 or 1B2
Metal drum other than steel or aluminum: 1N1
Plastic drum: 1H1 or 1H2
Wooden barrel: 2C1
Steel jerrican: 3A1 or 3A2
Plastic jerrican: 3H1 or 3H2
Plastic receptacle in steel, aluminum, fiber or plastic drum: 6HA1, 6HB1, 6HG1 or 6HH
Plastic receptacle in steel, aluminum, wooden, plywood or fiberboard box: 6HA2, 6HB2, 6HC, 6HD2 or 6HG2
Glass, porcelain or stoneware in steel, aluminum or fiber drum: 6PA1, 6PB1 or 6PG1
Glass, porcelain or stoneware in steel, aluminum, wooden or fiberboard box: 6PA2, 6PB2, 6PC or 6PG2
Glass, porcelain or stoneware in solid or expanded plastic packaging: 6PH1 or 6PH2
Plastic receptacle in plywood drum: 6HD1
Glass, porcelain or stoneware in plywood drum or wickerwork hamper: 6PD1 or 6PD2
Cylinders, as prescribed for any compressed gas, except for Specifications 8 and 3HT

§ 173.204 Non-bulk non-specification packagings for certain hazardous materials.

When § 172.101 of this subchapter specifies that a liquid or solid hazardous material be packaged under this section, any appropriate non-bulk packaging which conforms to the general packaging requirements of Subpart B of Part 173 may be used for its transportation. Packagings need not conform to the requirements of Part 178 of this subchapter.

§ 173.205 Specification cylinders for liquid hazardous materials.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, any specification cylinder, except those specified for acetylene, is authorized. Cylinders used for poisonous materials (Division 6.1 or 2.3) must conform to the requirements of § 173.40.

§ 173.211 Non-bulk packagings for solid hazardous materials in Packing Group I.

(a) When § 172.101 of this subchapter specifies that a solid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its

transportation. Each package must conform to the general packaging requirements of Subpart B of Part 173, to the requirements of Part 178 at the Packing Group I performance level, and to the requirements of the special provisions of Column 7 of the § 172.101 Table.

(b) The following combination packagings are authorized:

Outer packagings:
Steel drum: 1A2
Aluminum drum: 1B2
Plywood drum: 1D
Fiber drum: 1G
Plastic drum: 1H2
Wooden barrel: 2C2
Steel jerrican: 3A2
Plastic jerrican: 3H2
Steel box: 4A1 or 4A2
Aluminum box: 4B1 or 4B2
Natural wood box: 4C1 or 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Solid plastic box: 4H2
Inner packagings:
Glass or earthenware receptacles
Plastic receptacles
Metal receptacles
Glass ampoules

(c) Except for transportation by passenger aircraft, the following single packagings are authorized:

Steel drum: 1A1 or 1A2
Aluminum drum: 1B1 or 1B2
Metal drum other than steel or aluminum: 1N1 or 1N2
Plastic drum: 1H1 or 1H2
Steel jerrican: 3A1 or 3A2
Plastic jerrican: 3H1 or 3H2
Steel box with liner: 4A2
Aluminum box with liner: 4B2
Natural wood box, sift proof: 4C2
Plastic receptacle in steel, aluminum, plywood, fiber or plastic drum: 6HA2, 6HB1, 6HD1, 6HG1 or 6HH
Plastic receptacle in steel, aluminum, wooden, plywood or fiberboard box: 6HA1, 6HB2, 6HC, 6HD2 or 6HG2
Glass, porcelain or stoneware in steel, aluminum, plywood or fiber drum: 6PA1, 6PB1, 6PD1 or 6PG1
Glass, porcelain or stoneware in steel, aluminum, wooden or fiberboard box: 6PA2, 6PB2, 6PC, or 6PG2
Glass, porcelain or stoneware in expanded or solid plastic packaging: 6PH1 or 6PH2

§ 173.212 Non-bulk packagings for solid hazardous materials in Packing Group II.

(a) When § 172.101 of this subchapter specifies that a solid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each package must conform to the general packaging requirements of Subpart B of Part 173, to the requirements of Part 178 at the Packing Group I or II performance level, and to the requirements of the special provisions of Column 7 of the § 172.101 Table.

(b) The following combination packagings are authorized:

Outer packagings:
Steel drum: 1A2
Aluminum drum: 1B2
Plywood drum: 1D
Fiber drum: 1G
Plastic drum: 1H2
Wooden barrel: 2C2
Steel jerrican: 3A2
Plastic jerrican: 3H2
Steel box: 4A1 or 4A2
Aluminum box: 4B1 or 4B2
Natural wood box: 4C1 or 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Solid plastic box: 4H2
Inner packagings:
Glass or earthenware receptacles
Plastic receptacles
Metal receptacles
Glass ampoules

(c) Except for transportation by passenger aircraft, the following single packagings are authorized:

Steel drum: 1A1 or 1A2
Aluminum drum: 1B1 or 1B2
Plywood drum: 1D
Plastic drum: 1H1 or 1H2
Fiber drum: 1G
Metal drum other than steel or aluminum: 1N1 or 1N2
Wooden barrel: 2C1 or 2C2
Steel jerrican: 3A1 or 3A2
Plastic jerrican: 3H1 or 3H2
Steel box: 4A1
Steel box with liner: 4A2
Aluminum box: 4B1
Aluminum box with liner: 4B2
Natural wood box: 4C1
Natural wood box, sift proof: 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Expanded plastic box: 4H1
Solid plastic box: 4H2
Bag, woven plastic: 5H1, 5H2 or 5H3
Bag, textile: 5L1, 5L2 or 5L3
Bag, paper, multiwall, water resistant: 5M2
Plastic receptacle in steel, aluminum, plywood, fiber or plastic drum: 6HA1, 6HB1, 6HD1, 6HG1 or 6HH
Plastic receptacle in steel aluminum, wood, plywood or fiberboard box: 6HA2, 6HB2, 6HC, 6HD2 or 6HG2
Glass, porcelain or stoneware in steel, aluminum, plywood or fiber drum: 6PA1, 6PB1, 6PD1 or 6PG1
Glass, porcelain or stoneware in steel, aluminum, wooden of fiberboard box: 6PA2, 6PB2, 6PC or 6PG2
Glass, porcelain or stoneware in expanded or solid plastic packaging: 6PH1 or 6PH2

§ 173.213 Non-bulk packagings for solid hazardous materials in Packing Group III.

(a) When § 172.101 of this subchapter specifies that a solid hazardous material be packaged under this section, only non-bulk packagings prescribed in this section may be used for its transportation. Each package must conform to the general packaging requirements of Subpart B of Part 173, to the requirements of Part 178 at the Packing Group I, II or III performance level, and to the requirements of the special provisions of Column 7 of the § 172.101 Table.

(b) The following combination packagings are authorized:

Outer packagings:
Steel drum: 1A2
Aluminum drum: 1B2
Plywood drum: 1D
Fiber drum: 1G
Plastic drum: 1H2
Wooden barrel: 2C2
Steel jerrican: 3A2
Plastic jerrican: 3H2
Steel box: 4A1 or 4A2
Aluminum box: 4B1 or 4B2
Natural wood box: 4C1 or 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Solid plastic box: 4H2
Inner packagings:
Glass or earthenware receptacles
Plastic receptacles
Metal receptacles
Glass ampoules

(c) The following single packagings are authorized:

Steel drum: 1A1 or 1A2
Aluminum drum: 1B1 or 1B2
Plywood drum: 1D
Fiber drum: 1G
Plastic drum: 1H1 or 1H2
Metal drum other than steel or aluminum: 1N1 or 1N2
Wooden barrel: 2C1 or 2C2
Steel jerrican: 3A1 or 3A2
Plastic jerrican: 3H1 or 3H2
Steel box with liner: 4A2
Steel box: 4B1
Aluminum box with liner: 4B2
Natural wood box: 4C1
Natural wood box, sift proof: 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Expanded plastic box: 4H2
Solid plastic box: 4H2
Bag, woven plastic: 5H1, 5H2 or 5H3
Bag, textile: 5L1, 5L2 or 5L3
Bag, paper, multiwall, water resistant: 5M2
Plastic receptacle in steel, aluminum, plywood, fiber or plastic drum: 6HA1, 6HB1, 6HD1, 6HG1 or 6HH
Plastic receptacle in steel, aluminum, wooden, plywood or fiberboard box: 6HA2, 6HB2, 6HC, 6HD2 or 6HG2
Glass, porcelain or stoneware in steel, aluminum, plywood or fiber drum: 6PA1, 6PB1, 6PD1 or 6PG1
Glass, porcelain or stoneware in steel, aluminum, wooden or fiberboard box: 6PA2, 6PB2, 6PC or 6PG2
Glass, porcelain or stoneware in expanded or solid plastic packaging: 6PH1 or 6PH2

§ 173.214 Packagings which require approval by the Director, OHMT.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, packagings and method of shipment must be approved by the Director, OHMT, prior to the first shipment.

§ 173.216 Asbestos, blue or white.

(a) Asbestos, blue or white, includes each of the following hydrated mineral silicates: Chrysolite, crocidolite, amosite, anthophyllite asbestos, tremolite asbestos, actinolite asbestos, and every product containing any of these materials.

(b) Commercial asbestos is any material or product containing asbestos that has commercial value because of its asbestos content.

(c) Asbestos which is immersed or fixed in a natural or artificial binder material (such as cement, plastic, asphalt, resins or mineral ore), waste asbestos, and manufactured products containing asbestos or any materials or products whose commercial value is not dependent on their asbestos content, are not subject to the requirements of this subchapter.

(d) Packagings for commercial asbestos must conform to the general packaging requirements of Subpart B of this part but need not conform to the requirements of Part 178 of this subchapter. Commercial asbestos must be offered for transportation and transported in—

(1) Rigid, leaktight packagings, such as metal or fiber drums, portable tanks, hopper-type rail cars, or hopper-type motor vehicles;

(2) Bags or other non-rigid packagings in closed freight containers, motor vehicles, or rail cars that are loaded by and for the exclusive use of the cosignor and unloaded by the consignee;

(3) Bags or other non-rigid packagings which are dust and sift-proof. When transported by other than private carrier by highway, such packagings containing asbestos must be palletized and unitized by methods such as shrink-wrapping in plastic film or wrapping in fiberboard secured by strapping. Pallets need not be used during transportation by vessel for loads with slings that are unitized by methods such as shrink-wrapping, if the slings adequately and evenly support the loads and the unitizing method prevents shifting of the bags or other non-rigid packagings during conditions normally incident to transportation; or

(4) Bags or other non-rigid packagings which are dust and sift-proof in strong outside fiberboard or wooden boxes.

§ 173.217 Carbon dioxide, solid (dry ice).

(a) Carbon dioxide, solid (dry ice), when offered for transportation by aircraft or water, must be packed in packagings designed and constructed to permit the release of carbon dioxide gas to prevent a buildup of pressure that could rupture the packagings. Packagings must conform to the general packaging requirements of Subpart B of this part but need not conform to the requirements of Part 178 of this subchapter. For each shipment by air exceeding five pounds per package, advance arrangements between the shipper and each carrier must be made.

(b) Railroad cars and motor vehicles containing solid carbon dioxide, when accepted for transportation on board ocean vessels, must be conspicuously marked on two sides "WARNING CO_2 SOLID (DRY ICE)."

(c) Other packagings, when accepted for transportation on board ocean vessels, must be marked "CARBON DIOXIDE, SOLID—DO NOT STOW BELOW DECKS."

(d) Not more than 200 kg (440.9 lbs) of solid carbon dioxide may be transported in any one cargo compartment or bin on any aircraft except by specific and special arrangement between the shipper and the aircraft operator.

(e) Carbon dioxide, solid (dry ice) is excepted from the shipping paper and certification requirements of this subchapter if the requirements of paragraphs (a) and (d) of this section are complied with and the package is marked "Carbon dioxide, solid" or "Dry ice" and marked with an indication that the material being refrigerated is used for diagnostic or treatment purposes (e.g., frozen medical specimens).

§ 173.218 Fish meal or fish scrap.

(a) Except as provided in paragraph (b) of this section, fish meal or fish scrap, containing at least 6 percent but not more than 12 percent water, is authorized for transportation by water only when packaged as follows:

(1) Burlap (jute) bag;

(2) Multi-wall paper bag;

(3) Polyethylene-lined burlap or paper bag;

(4) Cargo tank;

(5) Portable tank;

(6) Rail car; or

(7) Freight container.

(b) Fish meal or fish scrap may not be offered for transportation if the temperature of the material exceeds 49° C (120.2 °F).

(c) When fish scrap or fish meal is offered for transportation by vessel in bulk in freight containers, the fish meal must contain at least 100 PPM of anti-oxident (ethoxyquin) at the time of shipment.

§ 173.219 Life rafts, aircraft survival kits, etc.

(a) A life raft or aircraft survival kit or aircraft evacuation slide containing small quantities of hazardous materials which are required as part of the life-saving appliance must conform to the requirements of this section. Packagings are excepted from the specification packaging requirements of this subchapter.

(b) Hazardous materials must be packaged as follows:

(1) Non-flammable compressed gases must be packaged in cylinders in accordance with the requirements of this subchapter;

(2) Smoke and illumination signal flares must be in plastic or fiberboard receptacles;

(3) Strike-anywhere matches must be cushioned to prevent movement or friction in a cylindrical metal or composition receptacle with a screw-type closure;

(4) Flammable liquids must be in strong inner packagings in a repair kit; and

(5) Limited quantities of other hazardous materials are permitted if packaged in accordance with the requirements of this subchapter.

(c) Materials not subject to the requirements of this subchapter which are an integral part of the life-saving appliance must be packaged in a strong fiberglass kit case which is overpacked in a waterproof fiberboard packaging, or be packaged in other strong outer packagings.

§ 173.220 Internal combustion engines, self-propelled vehicles, and mechanical equipment containing internal combustion engines or wet batteries.

(a) *Applicability.* An internal combustion engine, self-propelled vehicle, or mechanized equipment is subject to the requirements of this subchapter when transported as cargo on a transport vehicle if—

(1) The engine or fuel tank contains a flammable liquid or gaseous fuel;

(2) It is equipped with a wet electric storage battery other than a non-spillable battery; or

(3) It contains other hazardous materials subject to the requirements of this subchapter.

(b) *Flammable liquid fuel.* Except as provided in this paragraph, flammable liquid fuel tanks must be completely drained and securely closed. Up to 500 milliliters (16.9 ounces) of fuel may be left in engine components and fuel lines provided the lines are securely closed to

prevent leakage of fuel. Fuel may remain in engines and tanks installed in self-propelled vehicles and mechanical equipment under the following conditions:

(1) For transportation by motor vehicle or rail car, the fuel tanks must be securely closed.

(2) For transportation by vessel, the shipment must conform to § 176.905 of this subchapter; and

(3) For transportation by aircraft, the shipment must conform to § 175.305 of this subchapter.

(c) *Wet batteries.* Wet batteries must either be installed, securely fastened in an upright position, and protected against short circuits and leakage or be removed and packaged separately under § 173.159. In addition—

(1) For transportation by vessel, the shipment must conform to § 176.905 of this subchapter; and

(2) For transportation by passenger-carrying aircraft, a wheelchair equipped with a wet battery must conform to § 173.222.

(d) *Truck bodies or trailers on flat cars.* Truck bodies or trailers with automatic heating or refrigerating equipment of the flammable liquid type may be shipped with fuel tanks filled and equipment operating or inoperative, when used for the transportation of other freight and loaded on flat cars as part of a joint rail and highway movement, provided the equipment and fuel supply conform to the requirements of § 177.834(l) and are of a type examined by the Bureau of Explosives and approved by the Director, OHMT.

(e) *Gases.* Compressed gas tanks and cylinders, containing gases, which are component parts of vehicles or mechanical equipment must conform to § 173.306.

(f) *Other hazardous materials.* Other hazardous materials must be packaged and transported in accordance with the requirements of this subchapter.

(g) *Exceptions.* Except as provided in paragraph (f) of this section, shipments made under the provisions of this section—

(1) Are not subject to any other requirements of this subchapter, for transportation by motor vehicle or rail car; and

(2) Are not subject to the requirements of Subparts D, E, and F (marking, labeling, and placarding, respectively) of Part 172 of this subchapter, for transportation by vessel or aircraft.

§ 173.221 Polystyrene beads, expandable.

Polystyrene beads or granules, expandable, impregnated with flammable gas or liquid as a blowing agent and plastic moulding materials in dough, sheet or extruded rope form must be packed in wooden (4C1 or 4C2), plywood (4D), fiberboard (4G) or reconstituted wood (4F) boxes with sealed inner plastic liners, plywood drums (1D), fiber drums (1G) with sealed inner plastic liner or in metal (1A1, 1A2, 1B1 or 1B2) packagings.

§ 173.222 Wheelchairs equipped with wet electric storage batteries.

(a) For transportation by highway, rail, water, or cargo aircraft only, wheelchairs equipped with wet electric storage batteries must conform to the provisions in § 173.220(c) of this part.

(b) For transportation by passenger-carrying aircraft, wheelchairs equipped with wet electric storage batteries are not subject to requirements of this subchapter other than the following:

(1) Wheelchairs equipped with non-spillable batteries as defined in § 173.159(d) of this subchapter may be shipped as checked luggage provided the battery is disconnected, the battery terminals are insulated to prevent accidental short circuits, and the battery is securely attached to the wheelchair.

(2) Wheelchairs equipped with spillable batteries may be shipped as checked baggage, provided that the wheelchair can be loaded, stowed, secured, and unloaded while always in an upright position. The battery must be disconnected, the terminals insulated to prevent accidental short circuits, and the battery securely attached to the wheelchair. The pilot-in-command must be advised, either orally or in writing, prior to departure, of the location of the wheelchair aboard the aircraft. If the wheelchair cannot be loaded, stowed, secured and unloaded always in an upright position, the battery must be removed and the wheelchair may then be carried without restriction. The removed battery must be carried in strong, rigid, outside packagings as follows:

(i) Outside packagings must be leaktight, impervious to battery fluid, loaded aboard the aircraft in accordance with the required orientation markings and be protected against upset by being secured to pallets or by being secured in cargo compartments using appropriate means (other than by bracing with freight or baggage) such as by use of restraining straps, brackets or holders;

(ii) Batteries must be protected against short circuits, secured upright in their outside packagings, and surrounded by compatible absorbent material sufficient to absorb their total liquid contents; and

(iii) Outside packagings must be marked to indicate proper orientation, and with the words "Battery, wet, with wheelchair", and be labeled with a CORROSIVE label.

§ 173.225 Packagings for organic peroxides.

(a) When the 172.101 Table specifies that an organic peroxide be packaged under this section, only non-bulk packagings which conform to the provisions of this section may be used for its transportation. Organic peroxides which require temperature control for stabilization are subject to the provisions of § 173.21(f) of this part.

(b) *Organic peroxides table.*

(1) The first column of the table gives the identification numbers for organic peroxides as specified in Column 4 of the § 172.101 Table.

(2) The second column gives the packing group as specified in Column 5 of the § 172.101 Table. Each packaging used for an organic peroxide must be capable of meeting the test requirements of Subpart M of Part 178 at the specified level of performance.

(3) The third column specifies the packaging method or methods which must be used to pack an organic peroxide. The table of packaging methods in paragraph (c) of this section defines the packaging methods.

(4) The fourth column indicates, by the letters "TC", that an organic peroxide may require temperature control for stabilization. See § 173.21(f) of this part for provisions applicable to such materials.

ORGANIC PEROXIDES TABLE

Identification number (UN or NA) (1)	Packing group (2)	Packaging methods (3)	Temperature control (4)
2080	II	P1a, P8	
2081	II	P1a, P8	
2082	I	P1f, P13b	TC
2083	II	P1b, P2d, P8	TC
2084	I	P1b, P8	
2085	I	P1g, P1h, P13a, P14.	
2087	II	P1a, P2c, P3b, P6a, P16, P20a, P20b, P30.	
2088	I	P1d, P13b	
2089	II	P1a, P3b, P6a, P20b, P20d.	
2090	II	P1b, P2f, P6b	
2091	II	P1a, P2c, P8, P10, P22a, P25b.	
2092	I	P1a, P8, P10, P22a, P24.	

ORGANIC PEROXIDES TABLE—Continued

Identification number (UN or NA) (1)	Packing group (2)	Packaging methods (3)	Temperature control (4)
2093	I	P1a, P8, P10, P22a, P24.	
2094	I	P1a, P8, P10, P22a.	
2095	II	P1c, P8	
2096	II	P1a, P2d, P8	
2097	II	P1e, P8, P13b, P18.	
2098	II	P1a, P2c, P8, P10, P22a, P25b.	
2099	II	P15	
2100	II	P1a, P8	
2101	II	P1a, P2a, P3b, P6a, P8, P16, P20c, P20d, P22a, P25b, P30.	
2102	II	P1a, P2c, P8, P22b, P25b.	
2103	II	P1e, P13b	
2104	II	P1a, P2d, P8	
2105	II	P1f, P3b, P6a, P20c, P20d, P21.	
2106	II	P1a, P8	
2107	II	P1a, P2c, P8, P22a, P25b.	
2108	II	P1a, P2c, P3b, P6a, P16, P20c, P20d, P22a, P25b.	
2110	II	P1b, P8	TC
2111	II	P1a, P2d, P8	
2112	II	P1a, P3b, P6a, P20c, P20d, P24.	
2113	II	P1b, P2f, P6b	
2114	II	P1a, P2c, P3b, P6a, P16, P20c, P20d.	
2115	II	P1b, P2d, P8	
2116	I	P1a, P2c, P8, P22b, P25b.	
2117	I	P1c, P12, P13b	
2118	I	P1a, P2c, P3b, P6a, P8, P16, P20b, P20d, P22a, P25b.	
2119	I	P1b, P2d, P8	
2120	II	P1a, P2c, P3b, P6a, P17, P20b, P24, P25a.	TC
2121	II	P1a, P2a, P24	
2122	II	P1b	TC
2123	II	P1b, P2d, P8	TC
2124	II	P1a, P3b, P6a, P13a, P14, P20b.	
2125	I	P1a, P2c, P8, P22b, P25c.	
2126	I	P1a, P2d, P8	
2127	I	P1a, P8	
2128	II	P1b, P2d, P8, P18, P24, P25a.	TC
2129	II	P1a, P2c, P3b, P6a, P24, P25a.	TC
2130	II	P1a, P2c, P3b, P6a.	TC
2131	I	P1c, P3a	
2132	II	P1b, P2d, P8, P24, P25a.	TC
2133	II	P1h, P7, P9, P13b.	
2134	II	P1b, P2d, P8	
2135	II	P1d, P13b, P14, P15.	
2136	II	P1a, P2c, P22a, P25b.	
2137	II	P1b, P6b	
2138	II	P1a, P2c, P3b, P6a, P16, P20b, P20d, P30.	
2139	II	P1b, P2d, P8	
2140	II	P1e, P8, P18	
2141	II	P16	
2142	II	P1e, P18	TC
2143	II	P1b, P8, P18	TC
2144	II	P1e	
2145	II	P1e, P18	
2146	II	P1a, P8	
2147	II	P1a	
2148	II	P1a, P3b, P6a, P14, P20c, P20d.	
2149	I	P1f, P14, P20d	TC
2150	I	P1d	TC
2151	II	P1b	TC
2152	I	P1d, P14, P20d	TC
2153	I	P1b	TC
2154	II	P1a, P3b, P6a, P20c, P20d.	TC
2155	II	P1a, P8, P18	
2156	II	P1a	
2157	II	P1b, P18	
2158	II	P1a, P18	
2159	II	P1a	
2160	II	P1e	
2161	I	P1e, P18	
2162	I	P1a, P2c, P8, P22b, P24, P25c.	
2163	I	P1b	TC
2164	II	P1a, P2c	TC
2165	I	P1d	
2166	II	P1d	
2167	II	P1a, P8	
2168	II	P1a	
2169	II	P1b	TC
2170	II	P1b, P8, P24, P25a.	
2171	I	P1a, P2c, P8, P22b, P25c.	
2172	II	P1d, P3b, P6a, P20c, P20d, P21.	
2173	II	P1d, P3b, P6a, P20c, P20d, P21.	
2174	I	P1d, P12	
2175	II	P1b	TC
2176	I	P1d	TC
2177	II	P1e	
2178	II	P20d	
2179	II	P1e	
2180	II	P1e	
2182	II	P1f	TC
2183	II	P2d, P8, P9	
2184	II	P1e, P8	
2185	II	P1e, P8	
2255	I	P1i	
2550	I	P1a, P8	
2551	II	P1b, P2d, P8	
2562	II	P1e, P18	
2592	II	P1a	
2593	I	P1b	TC
2594	II	P1e	
2595	II	P1a	TC
2596	II	P1a	
2597	II	P1e	TC
2598	II	P1a	
2755	II	P28	
2756	I	P1a, P30	
2883	II	P1a	
2884	II	P1a	
2885	II	P1a	
2886	II	P1a	
2887	II	P1a	
2888	II	P1a	TC
2889	II	P1e	
2890	II	P1b, P2f, P6b	
2891	II	P1e	TC
2892	II	P1a, P20a, P24	TC
2893	II	P1a, P20a, P24	TC
2894	II	P1a, P20a, P24	TC
2895	II	P1a, P20a, P24	TC
2896	II	P1a, P2c, P3b, P6a, P16, P22a, P25b, P30.	
2897	II	P1a	
2898	II	P1e	TC
2899	I	P1a, P30	
2957	II	P1e	TC
2958	II	P1a	
2959	II	P1e	
2960	II	P1a	TC
2961	II	P1a	TC
2962	I	P1a, P13b, P14, P15.	TC
2963	II	P1b, P3b	TC
2964	II	P1e	TC
3044	II	P1a	
3045	I	P1a, P2a, P24	

ORGANIC PEROXIDES TABLE—Continued

Identification number (UN or NA)	Packing group	Packaging methods	Temperature control
(1)	(2)	(3)	(4)
3046	I	P1a	
3047	II	P1b, P2d, P8	TC

(e) *Table of packaging methods.*

(1) The first column lists in alphanumeric sequence, the packaging methods for organic peroxides.

(2) The second column specifies the maximum net contents permitted in each *inner packaging or receptacle. If no* combination packagings are authorized, this column is blank.

(3) The third column specifies the maximum net contents permitted in an outer packaging, including a single, combination or composite packaging.

(4) The fourth column specifies inner *packagings which are permitted for use,* when applicable. If no combination packagings are authorized, this column is blank.

(5) The fifth column specifies outer packagings which are permitted for use. If inner packagings are specified in the fourth column, then the packaging specified in the fifth column must be used as the outer packaging of a combination packaging; otherwise, it may be used as a single packaging.

(6) The sixth column specifies composite packagings which are permitted for use, when applicable. If no composite packagings are authorized, this column is blank.

(7) The *Table of Packaging Methods* is as follows:

Packaging method	Maximum net contents of each inner *packaging or* receptacle	Maximum net contents of outer packaging	Description of packagings		
			Inner packagings	*Outer packagings*	Composite packagings
(1)	(2)	(3)	(4)	(5)	(6)
P1a	50 kg	50 kg		Fiberboard box (4G); or	
P1b	25 kg	50 kg	Plastic bottles, jars, bags or boxes		
P1c	10 kg	50 kg			6HC; or
P1d	5 kg	50 kg		fiber drum (1G); or	6HD1; or
P1e	25 kg	25 kg			6HG1; or,
P1f	6 kg	25 kg		plywood drum (1D); or	6HG2
P1g	5 kg	5 kg			
P1h	1 kg	10 kg		wooden box (4C1)	
P1j	500 g	1 kg			
P2a	100 kg	100 kg	Plastic bottles, jars, bags or boxes	Steel drum, removable head (1A2); or	6HA1; or
P2c	50 kg	50 kg		aluminum drum, removable head (1B2); or.	6HA2 (steel box only); or
P2d	25 kg	50 kg		steel box (4A1); or	6HB1; or
P2f	10 kg	50 kg		aluminum box (4B1)	6HB2 (aluminum box only)
P3a		60 kg			
P3b		30 kg			6HA2, (steel crate only); or 6HB2 (aluminum crate only); or 6HD1 or 6HG1.
P6a	10 kg	90 kg	Metal Cans, or glass bottles in metal cans, or plastic bags in metal cans, or	Fiberboard box (4G); or fiber drum (1G); or plywood drum (1D); or	
P6b	10 kg	50 kg	plastic bottles in metal cans	wooden box (4C1)	
P7	3 kg	12 kg	Fiberboard box (4G); or Aluminum bottles or jars with plastic closures.	fiber drum (1G); or plywood drum (1D); or wooden box (4C11)	
Fiberboard box (4G); or P8	2 L	50 L	Glass bottles	fiber drum (1G); or plywood drum (1D); or	6PC; or 6PD1; or;
P9	7.5 L	7.5 L	Glass or earthenware bottles; or metal cans.	wooden box (4C1)	6PG1; or 6PG2.
				Steel drum, removable head (1A2); or	

Packaging method	Maximum net contents of each inner packaging or receptacle	Maximum net contents of outer packaging	Description of packagings		
			Inner packagings	Outer packagings	Composite packagings
(1)	(2)	(3)	(4)	(5)	(6)
P10	0.5 L	50 L	Glass bottles	aluminum drum, removable head (1B2); or steel box (4A1); or aluminum box: 4B1	
P12	1 kg	50 kg	Waxed fiberboard boxes	Fiberboard box (4G); or fiber drum (1G); or plywood drum (1D); or wooden box (4C1)	
P13a	500 g	25 kg			
P13b	500 g	14 kg	plastic boxes or bottles	wooden box (4C1), compartmented	
P14	500 g	25 kg	Paper bags with inner ply of plastic	Fiberboard box (4G), with fire-retardant liner and partitions of fire-retardant corrugated fiberboard.	
P15	500 g	500 g	Paper bag with inner ply of plastic, packed singly.	Fiberboard box (4G)	
P16	250 g	50 kg	Metal or plastic flexible tubes	Fiberboard box (4G), compartmented; or plywood box (4D), compartmented	
P17	500 g	500 g	Fiber jar with sealed cap closure, packed singly.	Wooden box (4C1)	
P18	500 ml	500 ml	Plastic bottle, packed singly	Fiberboard box (4G)	
P20a		200 kg		Fiber drum (1G), with plastic liner or internal coating of polyethylene.	6HG1
P20b		100 kg			
P20c		50 kg			
P20d		30 kg			
P21		50 kg		Plywood drum (1D), with plastic liner	6HD1
P22a		50 kg		Steel drum, (1A1) or (1A2)	
P22b		220 L			
P24		220 L		Steel drum, nonremovable head (1A1), with plastic liner; or. steel drum, removable head: 1A2 with plastic liner	6HA1
P25a		200 kg		Aluminum drum, (1B1) or (1B2)	
P25b		50 kg			
P25c		220 L			
P28	500 g	2 kg	Plastic bag individually packed in round cardboard carton of 2 litres capacity. Four cartons per package.	Fiberboard box (4G), or fiber drum (1G)	
P30		25 kg		Plastic drum (1H1) or (1H2)	

§ 173.226 Liquids toxic by inhalation, Division 6.1, Packing Group I, Zone A.

Division 6.1, Packing Group I, materials that are toxic by inhalation and that fall within the boundaries of Zone A in the graph found in § 173.133 shall be packed in non-bulk packagings in accordance with the following paragraphs:

(a) In specification cylinders, as authorized in § 173.40.

(b) In 1A1, 1B1 or 1N1 drums further packed in a 1A2 or 1H2 drum. Both inner and outer drums must conform to the performance test requirements of Subpart M of Part 178 of this subchapter at the Packing Group I performance level. The outer drum must have a minimum thickness of 1.50 mm (0.059 inch) for a 1A2 outer drum or 6.30 mm (0.248 inch) for a 1H2 outer drum. Capacity of the inner drum may not exceed 220 L(58.1 gallons). In addition, the inner drum must—

(1) Be capable of satisfactorily withstanding the hydrostatic pressure test in § 178.605 of this subchapter at a test pressure of 550 kPa (79.8 psig);

(2) Satisfactorily withstand the leakproofness test in § 178.604 of this subchapter using an internal air pressure of at least twice the vapor pressure at 55 °C (131 °F) of the material to be packaged;

(3) Have screw closures that are—

(i) Closed and tightened to a torque prescribed by the closure manufacturer, using a device that is capable of measuring torque;

(ii) Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transportation; and

(iii) Provided with a cap seal that is properly applied in accordance with the cap seal manufacturer's recommendations and is capable of withstanding an internal pressure of at least 100 kPa (14.5 psig).

(4) Have a minimum thickness as follows:

(i) If the capacity of the inner drum is less than or equal to 120 L (31.7 gallons), the minimum thickness of the inner drum is—

(A) For a 1A1 or 1N1 drum, 1.3 mm (0.051 inch); and

(B) For a 1B1 drum, 3.9 mm (0.154 inch).

(ii) If the capacity of the inner drum is greater than 120 L (31.7 gallons), the thickness of the inner drum is—

(A) For a 1A1 or 1N1 drum, 1.7 mm (0.067 inch); and

(B) For a 1B1 drum, 4.7 mm (0.185 inch); and

(5) Be isolated from the outer drum by a shock-mitigating, nonreactive material. There must be a minimum of 5.0 cm (1.97 inches of cushioning material around the body of the inner drum, and at least 7.6 cm (2.99 inches) on the top and bottom, between the inner and outer drum.

(c) In combination packagings, consisting of an inner packaging system and an outer packaging, as follows:

(1) *Outer packagings:*
Steel drum: 1A2
Aluminum drum: 1B2
Plywood drum: 1D
Fiber drum: 1G
Plastic drum: 1H2
Wooden barrel: 2C2
Steel jerrican: 3A2
Plastic jerrican: 3H2
Steel box: 4A1 or 4A2
Aluminum box: 4B1 or 4B2
Natural wood box: 4C1 or 4C2
Plywood box: 4D
Reconstituted wood box: 4F
Fiberboard box: 4G
Expanded plastic box: 4H2
Solid plastic box: 4H2

(2) *Inner packaging system.* The inner packaging system consists of two packagings: an impact resistant receptacle of glass, earthenware, plastic or metal securely cushioned with a non-reactive, absorbent material and packed within a leak-tight packaging of metal or plastic. This combination packaging in turn is packed within the outer packaging. Capacity of each inner receptacle may not exceed 4 L (1.06 gallons). An inner receptacle that has a closure must have a screw type closure which is physically held in place by any means capable of preventing back-off of loosening of the closure by impact or vibration during transportation. Both the inner packaging system and the outer packaging must conform to the performance test requirements of Subpart M of Part 178 of this subchapter, at the Packaging Group I performance level. The inner packaging system must meet these tests *without the benefit of the outer packaging.* The total amount of liquid contained in the outer packaging may not exceed 16 L (4.24 gallons).

§ 173.227 Liquids toxic by inhalation, Division 6.1, Packing Group I, Zone B.

Division 6.1, Packing Group I, materials that are toxic by inhalation and that fall within the boundaries of Zone B in the graph found in § 173.133 shall be packed in non-bulk packagings which conform to the performance test requirements of Subpart M of Part 178 of this subchapter, at the Packing Group I performance level. The following packagings are authorized:

(a) In packagings as authorized in § 173.226; or

(b) In 1A1, 1B1, or 1N1 drums further packed in a 1A2 or 1H2 drum. Both the inner and outer drums must conform to the performance test requirements of Subpart M of Part 178 of this subchapter at the Packing Group I performance level. The outer drum must have a minimum thickness of 1.50 mm (0.059 inch) for a 1A2 outer drum or 6.30 mm (0.248 inch) for a 1H2 outer drum. In addition, the inner drum must—

(1) Satisfactorily withstand the leakproofness test in § 178.604 of this subchapter using an internal air pressure of at least two times the vapor pressure at 55 °C (131 °F) of the material to be packaged;

(2) Have screw closures that are—

(i) Closed and tightened to a torque prescribed by the closure manufacturer, using a device that is capable of measuring torque;

(ii) Physically held in place by any means capable of preventing back-off or loosening of the closure by impact or vibration during transportation; and

(iii) Provided with a cap seal that is properly applied in accordance with the cap seal manufacturer's recommendations and is capable of withstanding an internal pressure of at least 100 kPa (14.5 psig).

(3) Have a minimum thickness as follows:

(i) If the capacity of the inner drum is less than or equal to 120 L (31.7 gallons), the minimum thickness of the inner drum is—

(A) For a 1A1 drum, 1.3 mm (0.051 inch); and

(B) For a 1B1 drum, 3.9 mm (0.154 inch).

(ii) If the capacity of the inner drum is greater than 120 L (31.7 gallons), the thickness of the inner drum is

(A) For a 1A1 or 1N1 drum, 1.7 mm (0.067 inch); and

(B) For a 1B1 drum, 4.7 mm (0.185 inch); and

(4) Be isolated from the outer drum by a shock-mitigating, nonreactive material. There must be a minimum of 5.0 cm (1.97 inches of cushioning material around the body of the inner drum, and at least 7.6 cm (2.99 inches) on the top and bottom, between the inner and outer drum; and

(5) Have a capacity not greater than 220L (58.1 gallons).

(c) 1A1, 1B1 or 1N1 drums described in paragraph (b) of this section may be used without being further packed in a 1A2 or 1H2 drum if the shipper loads the material, blocks and braces the drums within the transport vehicle and seals the transport vehicle used. Drums may not be stacked (double decked) within the transport vehicle. Shipments must be from one origin to one destination only without any intermediate pickup or delivery.

§ 173.228 Bromine pentafluoride or bromine trifluoride.

(a) When the § 172.101 Table specifies that a hazardous material be packaged under this section, only non-bulk packagings prescribed in paragraph (b) of this section are authorized for its transportation. Each packaging must conform to the general packaging requirements of Subpart B of this part, to the specification requirements of Part 178 and to the requirements of the special provisions of Column 7 of the § 172.101 Table.

(b) Specification 3A150, 3AA150, 3B240, 3BN150, 4B240, 4BA240, 4BW240 and 3E1800 cylinders are authorized. Each valve outlet must be sealed by a threaded cap or threaded plug. Cylinder valves must be protected as specified for corrosive gases in § 173.301(g). No cylinder may be equipped with any pressure relief device. Specification 3E1800 cylinders must be packaged in accordance with the requirements of § 173.301(k).

§ 173.229 Chloric acid solution or chlorine dioxide hydrate, frozen.

(a) When the § 172.101 Table specifies that a hazardous material be packaged in accordance with this section, only 4G fiberboard boxes, with inner packagings of polyethylene or other suitable material, are authorized. Fiberboard boxes must be reinforced and insulated and sufficient dry ice must be used to maintain the hydrate or acid in a frozen state during transportation. Each packaging must conform to the general packaging requirements of Subpart B of Part 173, and to the requirements of Part 178 at the Packing Group I performance level. Shipments are authorized by private or contract carrier by motor vehicle only.

§ 173.230 Non-bulk packagings for ORM–D materials.

(a) *General.* Exceptions in the following paragraphs are permitted only if this section, or § 473.306 of this part, is referenced for the specific hazardous material in the § 172.101 Table of this subchapter.

(b) *Small arms ammunition.* (1) Small arms ammunition which has been classed as a Class C explosive may be reclassed and offered for transportation as ORM–D material when packaged in accordance with paragraph (b)(2) of this section. Shipments are excepted from the requirements of Subparts E (Labeling) and F (Placarding) of Part 172 of this subchapter. Small arms ammunition that may be shipped as ORM–D material is limited to:

(i) Ammunition for rifle, pistol or shotgun;

(ii) Ammunition with inert projectiles or blank ammunition;

(iii) Ammunition having no tear gas, incendiary, or detonating explosive projectiles; and

(iv) Ammunition not exceeding 50 caliber (½ inch) for rifle or pistol cartridges or 8 gauge for shotshells.

(2) Packaging for small arms ammunition as ORM–D material must be as follows:

(i) Ammunition must be packed in inside boxes, or in partitions which fit snugly in the outside packaging, or in metal clips;

(ii) Primers must be protected from accidental initiation;

(iii) Inside boxes, partitions or metal clips must be packed in securely closed strong outside packagings; and

(iv) Maximum gross weight is limited to 65 (29.5 kg) pounds per package.

(c) *Compressed gases.* A compressed gas which conforms to the provisions of paragraph (a)(1), (a)(3) except (a)(3)(vi), or (b) except (b)(1)(iii) of § 173.306 of this subchapter and is a "Consumer commodity" as defined in § 171.8 of this subchapter may be renamed "Consumer commodity" and reclassed as ORM–D material. Each completed package must conform to the requirements of Subpart B of this part and may not exceed 65 pounds (29.5 kg) gross weight. Shipments are excepted from the requirements of Subparts E (Labeling) and F (Placarding).

(d) Other consumer commodity exceptions are provided for Class (or Division) 3, 4.1, 5.1, 5.2, 6.2, 8 or 9 materials, if the § 172.101 Table entry for the specific material refers to, and the material meets the provisions in §§ 173.150, 173.151, 173.152, 173.153, 173.154 or 173.155, as appropriate.

Subpart F—Bulk Packaging for Hazardous Materials Other Than Classes 1 and 7

§ 173.240 Bulk packaging for certain flammable solids (Division 4.1), solid oxidizers (Division 5.1), corrosive solids (Class 8) and other similar low hazard materials.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) *Rail cars:* DOT Class 103, 104, 105, 107A, 109, 111, 112, 113, 114 and 115 tank cars; Class 106 and 110 tank car tanks; AAR Class 203W, 206W and 211W tank cars; and metal non-DOT specification, sift proof tank cars and sift proof closed cars.

(b) *Motor vehicles:* Specification MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, MC 312, MC 330, MC 331 and MC 338 cargo tank motor vehicles; metal non-DOT specification, sift proof cargo tank motor vehicles; and sift proof closed vehicles.

(c) *Portable tanks and bins:* DOT 51, 52, 53, 56, 57 and 60 portable tanks; marine portable tanks conforming to 46 CFR 64; non-DOT specification sift proof portable tanks and closed bins.

§ 173.241 Bulk packaging for certain combustible liquids (Class 3), flammable solids (Divisions 4.2 and 4.3), and other similar hazardous materials.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) *Rail cars:* DOT Class 103, 104, 105, 107A, 109, 111, 112, 113, 114 and 115 tank cars; Class 106 and 110 tank car tanks; AAR Class 203W, 206W and 211W tank cars.

(b) *Cargo tanks:* DOT specification MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, MC 312, MC 330, MC 331 and MC 338 cargo tank motor vehicles; and metal non-DOT specification cargo tank motor vehicles suitable for transport of liquids.

(c) *Portable tanks:* DOT 51, 52, 53, 56, 57 and 60 portable tanks; marine portable tanks conforming to 46 CFR 64; and metal non-DOT specification portable tanks suitable for transport of liquids.

§ 173.242 Bulk packaging for certain medium hazard liquids and solids, including solids with dual hazards.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) *Rail cars:* DOT Class 103, 104, 105, 107A, 109, 111, 112, 113, 114 or 115 tank cars; Class 106 or 110 tank car tanks; AAR Class 203W, 206W or 211W tank cars.

(b) *Cargo tanks:* Specification MC 300, MC 301, MC 302, MC 303, MC 304, MC 305, MC 306, MC 307, MC 310, MC 311, MC 312, MC 330, MC 331 and MC 338 cargo tank motor vehicles.

(c) *Portable tanks:* DOT 51, 52, 53, 56, 57 and 60 portable tanks; and marine portable tanks conforming to 46 CFR Part 64.

§ 173.243 Bulk packaging for certain high hazard liquids and dual hazard liquids which pose a moderate hazard.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) *Rail cars:* DOT Class 103, 104, 105, 107A, 109, 111, 112, 113, 114 and 115 tank cars; and Class 106 and 110 tank car tanks. Gauging devices are required on DOT 103, 104 and 111 tank cars. Riveted tank cars are not authorized.

(b) *Cargo tanks:* Specification MC 304, MC 307, MC 330, MC 331 and MC 338 cargo tank motor vehicles; and MC 310, MC 311 or MC 312 cargo tank motor vehicles with tank design pressure of at least 25 psig (172.4 kPa).

(c) *Portable tanks:* DOT 51 portable tanks; and DOT 60 and marine portable tanks conforming to 46 CFR Part 64 with design pressure of at least 25 psig (172.4 kPa).

§ 173.244 Bulk packaging for certain pyrophoric liquids (Division 4.2), poisonous liquids with inhalation hazards, (Division 6.1) and gases (Class 2).

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements

of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) DOT Classes 105, 107A, 109, 112, 113, and 114 tank cars; and Class 106 and 110 tank car tanks. Riveted tank cars are not authorized.

(b) Specification MC 330, MC 331 and MC 338 cargo tank motor vehicles.

(c) DOT 51 portable tanks.

§ 173.245 Bulk packaging for extremely hazardous materials such as poisonous gases (Division 2.3).

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) DOT Class 105S500W and 112S500W tank cars lagged with at least 4 inches of cork or equivalent; Class 106 or 110 tank car tanks; and Classes 105J500W and 112J500W tank cars. Bottom outlets are prohibited.

(b) Cargo tank motor vehicles and portable tanks, when approved by the Director, OHMT.

§ 173.248 Ethylene oxide.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) DOT Class 105A100W and 111A100W tank cars conforming with paragraphs (c) thru (h) of this section; and Class 105J100W tank cars conforming with paragraphs (c) thru (g) of this section.

(b) Specification MC 330 and MC 331 cargo tank motor vehicles and DOT 51 portable tanks conforming with paragraphs (c) thru (h) of this section.

(c) The pressure relief devices must be set to function at 75 psig (517.1 Kpa). Portable tanks fitted with non-reclosing devices made and in use prior to December 31, 1987, may continue to be used in ethylene oxide service.

(d) Outage must be sufficient to prevent the tank from becoming liquid full at 105 °F (40.6 °C). Consideration must be given to the lading temperature and solubility of inert gas padding in ethylene oxide as well as the partial pressure exerted by the gas padding.

(e) Each tank, loaded or empty, must be padded with dry nitrogen or other suitable inert gas of sufficient quantity to render the vapor pressure of the tank nonflammable up to 105 °F (40.6 °C). The gas used for padding must be free of impurities which may cause the ethylene oxide to polymerize, decompose or undergo other violent chemical reaction.

(f) Copper, silver, mercury, magnesium or their alloys may not be used in any part of the tank or appurtenances that are normally in contact with the lading.

(g) Neoprene, natural rubber and asbestos gaskets are prohibited. All packing and gaskets must be made of materials which do not react with or lower the autoignition temperature of the lading.

(h) Each tank must be insulated with cork (at least 4 inches (10.2cm) thick), or mineral wool, fiberglass or other suitable insulation material of sufficient thickness so that the thermal conductance at 60 °F (15.6 °C) is not more than 0.075 Btu per hour per square foot per degree F. temperature differential. Portable tanks made and in use prior to December 31, 1987 equipped with fusible plugs instead of a safety relief valve or frangible disc, must have sufficient insulation so that the tank as filled for shipment will not rupture in a fire. The insulation on portable tanks or cargo tank motor vehicles must be protected with a steel jacket at least 0.100 (2.54mm) inch thick, or as required by the specification.

§ 173.249 Bromine.

When § 172.101 of this subchapter specifies that a hazardous material be packaged under this section, only the following bulk packagings are authorized, subject to the requirements of Subparts A and B of Part 173 of this subchapter and the special provisions specified in Column 7 of the § 172.101 Table.

(a) DOT Class 105A300W or 105A500W tank cars. Class 105A500W tank cars may be equipped with manway cover plates, pressure relief valves, vent valves, and loading/unloading valves that are required on Class 105A-300W tank cars. Tank cars must conform with paragraphs (d) thru (f) of this section.

(b) Specification MC 310, MC 311, MC 312 cargo tank motor vehicles conforming with paragraphs (d) thru (f) of this section.

(c) Specification IM 101 intermodal portable tanks conforming with paragraphs (d) thru (f) of this section.

(d) The tank must be made from nickel-clad or lead-lined steel plate. Nickel cladding or lead lining must be on the inside of the tank. Nickel cladding must comprise at least 20 percent of the required minimum total thickness. Nickel cladding must conform to ASTM Specification B 162-69. Lead lining must be at least 0.1875 inch (4.7625mm) thick. All tank equipment and appurtenances in contact with the lading must be lined or made from metal not subject to deterioration by contact with lading.

(e) Maximum filling density is 300 percent of the tank's water capacity. Minimum filling density is 287 percent of the tank's water capacity. Maximum water capacity is 9,262 kilograms (20,400 pounds) for DOT 105A300W tank cars. Maximum quantity of lading in DOT 105A300W tank cars is 27,240 kilograms (60,000 pounds). Maximum water capactiy is 16,980 kilograms (37,400 pounds) for DOT 105A500W tank cars and DOT 105A500W tank cars equipped as described in paragraph (a) of this section. Maximum quantity of lading in DOT 105A500W tank cars is 49,940 kilograms (110,000 pounds).

(f) Tank shell and head thickness for cargo tank motor vehicles and portable tanks must be at least 0.375 inch (9.525mm) excluding lead lining.

The title to Subpart G would be revised to read as follows:

Subpart G—Gases; Preparation and Packaging

§ 173.300 [Removed]

Section 173.300 would be removed.

In § 173.306, the phrase "Subpart N of this part" would be revised to read "paragraph (h) of this section" in the last sentence of paragraph (a)(1), the introductory text of paragraph (a)(3) and the last sentence of the introductory text of paragraph (b), and paragraph (h) would be added to read as follows:

§ 173.306 Limited quantities of compressed gases.

* * * * *

(h) A limited quantity which conforms to the provisions of paragraph (a)(1) or (a)(3) or paragraph (b) of this section and is a "consumer commodity" as defined in § 171.8 of this subchapter, may be renamed "consumer commodity" and reclassed as ORM-D material. In addition to the exceptions provided by paragraphs (a) and (b) of this section—

(1) Outside packagings are not required to be marked "INSIDE CONTAINERS COMIPLY WITH PRESCRIBED REGULATIONS";

(2) Shipments of ORM-D materials are not subject to the shipping paper requirements of Subpart C of Part 172, unless offered or intended for transportation by aircraft; and

(3) Strong outer packagings as specified in this section and the, marking requirements specified in § 172.312 are not required for ORM–D materials when unitized in cages, carts or similar overpacks and when shipped by a private or contract motor carrier from a distribution center to a retail outlet.

§ 173.308 [Amended]

In paragraph (a) of § 173.308, the section reference "§ 173.21(e)" would be changed to "§ 173.21(i)".

In § 173.314, paragraph (a) and the introductory text of paragraph (f)(1) would be revised, and in paragraph (f) entries in the "MAXIMUM PERMITTED FILLING DENSITY" table would be revised for specific gravities of 0.609 and greater, as follows:

§ 173.314 Requirements for compressed gases in tank cars.

(a) *Definitions.* For definitions of compressed gases, see § 173.115.

* * * * *

(f) *Special requirements for liquefied petroleum gas and butadiene tank cars.*

(1) *Single unit tanks cars.* Maximum filling density for the following single unit tank cars is as shown in the "Insulated cars" column of the table following paragraph (f)(2) of this paragraph:

(i) DOT Class 105 tank cars;

(ii) DOT Class 112 and 114 tank cars equipped with insulation in accordance with § 179.100–4 of this subchapter and stencilled in accordance with footnote 13 of § 179.101–1 of this subchapter; and

(iii) DOT Class 111 tank cars equipped with insulation in accordance with § 179.200–4 of this subchapter and stencilled in accordance with footnote 3 of § 179.201–1 of this subchapter.

(2) Maximum filling density for other single unit tank cars is as shown in the "Uninsulated cars" column of the following table.

MAXIMUM PERMITTED FILLING DENSITY

Specific gravity at 60 °F.	Insulated cars		Uninsulated cars	
	April through October	November through March (see note 1)	April through October	November through March (see note 1)
* *	*	*	*	
Revise:				
0.609	57.710	58.88	57.64	58.88
0.610	57.800	59.00	57.76	59.00
0.611	57.890	59.10	57.87	59.10
0.612	57.980	59.20	57.98	59.20
0.613	58.09	59.30	58.09	59.30
0.614	58.21	59.40	58.21	59.40
0.615	58.32	59.50	58.32	59.50
0.616	58.43	59.63	58.43	59.63
0.617	58.55	59.75	58.55	59.75
0.618	58.66	59.88	58.66	59.88
0.619	58.77	59.97	58.77	59.97

MAXIMUM PERMITTED FILLING DENSITY—Continued

Specific gravity at 60 °F.	Insulated cars		Uninsulated cars	
	April through October	November through March (see note 1)	April through October	November through March (see note 1)
0.620	58.89	60.07	58.89	60.07
0.621	59.00	60.18	59.00	60.18
0.622	59.12	60.28	59.12	60.28
0.623	59.23	60.38	59.23	60.38
0.624	59.34	60.49	59.34	60.49
0.625	59.46	60.59	59.46	60.59
0.626	59.57	60.70	59.57	60.70
0.627	59.68	60.80	59.68	60.80
0.628	59.80	60.90	59.80	60.90
0.629	59.91	61.01	59.91	61.01
0.630	60.02	61.11	60.02	61.11
0.631	60.13	61.18	60.13	61.18
0.632	60.23	61.28	60.23	61.28
0.633	60.34	61.38	60.34	61.38
0.634	60.44	61.47	60.44	61.47
0.635	60.55	61.57	60.55	61.57

* * * * *

In § 173.315, paragraph (a)(2) would be added to read as follows:

§ 173.315 Compressed gases in cargo tanks and portable tanks.

(a) * * *

(2) Other gases not listed by name in the above table shall be shipped in portable tanks or cargo tanks subject to the following conditions:

(i) Minimum packaging design pressure must not be less than—

(A) For a non-flammable and non-toxic gas lading, (Division 2.2), the vapor pressure at the reference temperature of the lading.

(B) For a gas which is toxic or flammable, (Division 2.1 or 2.3), or both, the vapor pressure at the reference temperature of the lading plus one percent or 25 psig (172.4 kPa), whichever is less, for each additional hazard.

(ii) Maximum permitted filling density may not exceed that specified in paragraph (c) of this section.

* * * * *

In Subpart G, §§ 173.321, 173.322, 173.323, 173.324, 173.335, 173.338, and 173.340 would be added and §§ 173.334, 173.336, and 173.337 would be revised to read as follows:

§ 173.321 Ethylamine.

Ethylamine must be packaged as follows:

(a) In 1A1 drums which meet Packing Group I performance level requirements.

(b) In specification cylinders as prescribed for any compressed gas except acetylene.

§ 173.322 Ethyl chloride.

Ethyl chloride must be packaged in single or combination non-bulk packagings which meet Packing Group I performance level requirements, as follows:

(a) In 4C1, 4C2, 4D or 4F wooden boxes with glass, earthenware, or metal inner receptacles not over 500 grams (1.1 pounds) capacity each.

(b) In 4G fiberboard boxes with glass, earthenware, or metal inner receptacles not over 500 grams (1.1 pounds) capacity each. Outer packagings may not exceed 30 kilograms (66.2 pounds) gross weight.

(c) In 1A1 drums of not over 100 liters (37.9 gallons) capacity each.

§ 173.323 Ethylene oxide.

(a) For packaging ethylene oxide in non-bulk packagings, copper, silver mercury and their alloys shall not be used in any part of a packaging, valve, or other packaging appurtenance if that part is normally in contact with ethylene oxide liquid or vapor. All packaging and gaskets must be constructed of materials which do not react spontaneously with or lower the autoignition temperature of ethylene oxide.

(b) Ethylene oxide must be packaged as follows:

(1) In 4G fiberboard boxes with one inner glass ampoule or vial of no more than 100 grams (3.5 ounces) capacity cushioned with incombustible material. The completed package must be capable of passing Packing Group I performance tests.

(2) In 4G fiberboard boxes constructed with top and bottom pads and perimeter liner. Inner packagings must be aluminum receptacles of no more than 135 grams (4.8 ounces) capacity cushioned with incombustible material. No more than 12 receptacles allowed in one box and no more than 10 boxes may be overpacked under the provisions of § 173.25 of this Part. Each completed package must be capable of passing Packing Group I performance tests.

(3) In 4C1, 4C2, 4D or 4F wooden boxes or 4G fiberboard boxes with inner metal receptacles of no more than 340 grams (12 ounces) capacity. The metal receptacle must be capable of withstanding no less than a 180 psig (1241.1 kPa) burst pressure. No more than 12 receptacles may be packed in one box and each receptacle may not be liquid full below 180 °F (82.2 °C). Each inner receptacle must be insulated and equipped with a relief device of the fusible plug type with yield temperature of 157 °F to 170 °F (69.4 °C to 76.7 °C). The capacity of relief device and insulation must be such that the charged receptacle will not explode when tested by CGA Pamphlet C–14 method or other equivalent method. Each completed package must be capable of passing Packing Group I performance tests.

(4) In specification cylinders, as authorized for any compressed gas except acetylene. Cylinders must be seamless or welded steel (not brazed) with a nominal capacity of no more than 30 gallons (113.6 L) and may not be liquid full below 180 °F (82.2 °C). Cylinders over 3.79 liters (1 gallon) capacity must be equipped with eductor tubes and be insulated. Before each refilling, each cylinder must be tested for leakage at no less than 15 psig (103.4 kPa) pressure. In addition, each cylinder must be equipped with a fusible type relief device with yield temperature of 157 °F to 170 °F (69.4 °C to 76.7 °C). The capacity of the relief device and the effectiveness of the insulation must be such that the charged cylinder will not explode when tested by CGA Pamphlet C–14 method or other equivalent method.

(5) In 1A1 steel drums of no more than 61 gallons (230.9 L) and meeting Packing Group I performance standards. The drum must be lagged, of all welded construction with the inner shell having a minimum thickness of 2.0 mm (0.0787 inch) and the outer shell having a minimum thickness of 2.6 mm (0.1024 inch). Drums must be capable of withstanding a hydrostatic test pressure of 100 psig (689.5 kPa). Lagging must be of sufficient thickness so that the drum will not rupture when exposed to fire when filled with ethylene oxide and equipped with the required pressure relief device. The drum may not be liquid full below 185 °F (85 °C), and must be marked "THIS END UP" on the top head. Before each refilling, each drum must be tested for leakage at no less than 15 psig (103.4 kPa) pressure. Each drum must be equipped with a fusible type relief device with yield temperature of 157 °F to 170 °F (69.4 °C to 76.7 °C), and the capacity of the relief device must be such that the filled drum will not explode when tested by the method described in CGA Pamphlet C–14 or other equivalent method.

§ 173.324 Ethyl methyl ether.

Ethyl methyl ether must be packed as follows:

(a) In specification cylinders, as authorized for any compressed gas except acetylene; or

(b) In packagings as specified in § 173.201 which meet Packing Group I performance level requirements.

§ 173.334 Organic phosphates mixed with compressed gas.

Hexaethyl tetraphosphate, parathion, tetraethyl dithio pyrophosphate, tetraethyl pyrophosphate, or other Division 6.1 organic phosphates (including a compound or mixture), may be mixed with a compressed gas which must be nonflammable. This mixture must not contain more than 20 percent by weight of organic phosphate and must be packaged in specification 3A240, 3AA240, 3B240, 4A240, 4B240, 4BA240, or 4BW240 cylinders meeting the following requirements.

(a) Each cylinder may be charged with not more than 5 kg (11.0 pounds) of the mixture, to a maximum filling density of not more than 80 percent of the water capacity;

(b) Each cylinder must be charged in compliance with § 173.301 (e) and (f);

(c) No cylinder may be equipped with an eduction tube or a fusible plug;

(d) No cylinder may be equipped with any valve unless the valve is a type approved by the Director, OHMT;

(e) Cylinders must be overpacked in a box so arranged to protect each valve or other closing device from damage. Except as provided in paragraph (f) of this section, no more than four cylinders may be packed in a box. Each box with its closing device protection must be sufficiently strong to protect all parts of each inside cylinder from deformation or breakage if the completed package were dropped 1.8 meters (5.91 feet) onto solid concrete, impacting at the weakest point.

(f) Cylinders may be packed in strong wooden boxes with valves or other closing devices protected from injury, with not more than twelve cylinders in one outside wooden box. An outer fiberboard box may be used when not more than four such cylinders are to be shipped in one packaging. Valves must be adequately protected. Box and valve protection must be of strength sufficient to protect all parts of inner packagings and valves from deformation or breakage resulting from a drop of at least 1.8 meters (5.91 feet) onto a concrete floor, impacting at the weakest point.

§ 173.335 Gas generator assemblies.

Gas generator assemblies (aircraft) containing liquefied nonflammable, nontoxic gas and a solid propellant cartridge shall be packaged as follows:

(a) The gas shall be packaged in specification steel cylinders authorized for any compressed gas except acetylene not exceeding 10.5 L (2.77 gallons) internal volume and having a minimum design burst pressure of 19,700 kPa (2,857 psi);

(b) Fittings must be protected against damage under conditions normally incident to transport, any trigger shall be fitted with a safety locking pin, and a non-propulsive plug shall be installed on the discharge tube; and

(c) Each complete unit must be individually and tightly packed to prevent movement in wooden boxes (4CI or 4C2), plywood boxes (4D), reconstituted wood boxes (4F), fiberboard boxes (4G), or plastic boxes, (4HI and 4H2) of Packing Group II performance level, or in the original manufacturer's transit box.

§ 173.336 Nitrogen dioxide, liquid; nitrogen peroxide, liquid; and nitrogen tetroxide, liquid.

Nitrogen dioxide, liquid, nitrogen peroxide, liquid, and nitrogen tetroxide, liquid must be packed in specification cylinders as follows:

(a) As prescribed in § 173.192.

(b) Specification 3A480, 3AA480, 3AL1800, or 3E1800 metal cylinders, with valves removed, are authorized. Each valve opening must be closed by means of a solid metal plug with tapered thread properly luted to prevent leakages; valve protection cap must be used and be at least 4.76 mm (0.187 inches) thick gas-tight, with 4.76 mm (0.187 inches) faced seat for gasket and with United States standard form thread. Shipments in 3AL cylinders are authorized only when transported by highway or rail. Each cylinder must be cleaned in compliance with the requirements of Federal Specification RR–C–901b, paragraphs 3.7.2 and 3.8.2. Cleaning agents equivalent to those specified in RR–C–901b may be used; however, any cleaning agent must not be capable of reacting with oxygen. One cylinder selected at random from a group of 200 or less cleaned at the same time must be tested for oil contamination in accordance with Specification RR–C901b paragraph 4.4.2.3 and meet the standard of cleanliness specified.

§ 173.337 Nitric oxide.

Nitric oxide must be packed in Specification 3A1800, 3AA1800, 3E1800, or 3AL1800 cylinders charged to a pressure of not more than 5,170 kPa (749.7 psi) at 21.1 °C (70 °F). Cylinders must be equipped with a valve of stainless steel and valve seat of material which will not be deteriorated by contact with nitric oxide or nitrogen dioxide. Cylinders or valves may not be equipped with pressure relief devices of any type. Valve outlets must be sealed by a solid threaded cap or plug and an inert gasketing material. In addition—

(a) Specification 3E1800 cylinders must be overpacked in strong wooden boxes of such design as to protect valves from injury or accidental functioning under conditions incident to transportation. Each overpack must conform to § 173.25.

(b) Specification 3A, 3AA, and 3AL cylinders must have their valves protected by metal caps or other equally protective guards securely attached to the cylinders and be of sufficient strength to protect the valves from injury during transit, or by overpacking in strong wooden boxes of such design as to protect valves from injury or accidental functioning under conditions incident to transportation. Each overpack must conform to § 173.25. Shipments in 3AL cylinders are authorized only when transported by highway or rail.

(c) Each cylinder must be cleaned in compliance with the requirements of Federal Specification RR–C–901b, paragraphs 3.7.2 and 3.8.2. Cleaning agents equivalent to those specified in RR–C–901b may be used; however, any cleaning agent must not be capable of reacting with oxygen. One cylinder selected at random from a group of 200 or less cleaned at the same time must be tested for oil contamination in accordance with Specification RR–C–901b paragraph 4.4.2.3 and meet the standard of cleanliness specified.

§ 173.338 Tungsten hexafluoride.

Tungsten hexafluoride must be packed in specification 3A, 3AA, 3BN, or 3E (§§ 178.36, 178.37, 178.39, 178.42 of this subchapter) cylinders. Cylinders shall be equipped with a valve protection cap or be packed in a strong outside container complying with the provisions of § 173.40. Outlets of any valves must be capped or plugged. As an alternative, the cylinder opening may be closed by the use of a metal plug. Specification 3E cylinders must be shipped in an overpack that complies with the provisions of § 173.40.

§ 173.340 Tear gas devices.

(a) Packagings for tear gas devices must be approved prior to first shipment by the Director, OHMT.

(b) Tear gas devices may not be assembled with or packed in the same packaging with mechanically or manually operated firing, igniting, bursting, or other functioning elements unless of a type and design approved by the Director, OHMT.

(c) Tear gas grenades, tear gas candles, and similar devices must be packaged in packagings conforming to the requirements of Part 178 of this subchapter at the Packing Group II performance level, as follows:

(1) In UN 4CI, 4C2, 4D, or 4F metal-strapped wooden boxes. Functioning elements not assembled in grenades or devices must be in a separate compartment of these boxes, or in inner or separate outer boxes, UN 4CI 4C2, 4D, or 4F, and must be so packed and cushioned that they may not come in contact with each other or with the walls of the box during transportation. Not more than 50 tear gas devices and 50 functioning elements shall be packed in one box and the gross weight of the outer box may not exceed 35 kilograms (77.2 pounds).

(2) In a UN 1A2 metal drum. Functioning elements must be packed in a separate inner packaging or compartment. Not more than 24 tear gas devices and 24 functioning elements shall be packed in one outer drum and the gross weight of the drum may not exceed 35 kg. (77.2 pounds).

(3) In a UN 4G fiberboard box with inside tear gas devices meeting Specifications 2P or 2Q. Each inside packaging must be placed in fiberboard tubes fitted with metal ends or a fiber box with suitable padding. Not more than 30 inner packagings shall be packed in one outer box and the gross weight of the outer box may not exceed 16 kg (35.3 pounds).

(4) In other packagings of a type or design which is approved by the Director, OHMT.

(d) Tear gas devices may be shipped completely assembled when offered by or consigned to the U.S. Department of Defense, provided the functioning elements are so packed that they cannot accidently function. Outer packagings must be UN 4CI, 4C2, 4D, or 4F metal-strapped wooden boxes.

Subpart H—[Removed and reserved]

Subpart H would be removed and reserved.

Subpart I—Radioactive Materials

§ 173.416 [Amended]

In § 173.416, the reference "§ 178.34" would be revised to read "§ 178.360" in paragraphs (e) and (g), the reference "§ 178.104" would be revised to read "§ 178.354" in paragraph (d), the reference "§ 178.194" would be revised to read "§ 178.362" in paragraphs (e) and (f), and the reference "§ 178.195" would be revised to read "§ 178.364" in paragraph (g).

In § 173.417, the reference "§ 178.34" would be revised to read "§ 178.360" in paragraphs (b)(1) and (b)(2); the reference "§ 178.103" or "§ 178.103–5(a)", as appropriate, would be revised to read "§ 178.352" in paragraphs (a)(1), (a)(6)(iii) and (b)(1); the reference "§ 178.104" would be revised to read "§ 178.354" in paragraphs (a)(2) and (b)(2); the references "§ 178.120" and "§ 178.121" would be revised to read "§ 178.356" and "§ 178.358", respectively, in paragraphs (a)(8) and (b)(5); and the introductory text of paragraph (a)(6) would be revised to read as follows:

§ 173.417 Authorized packaging—fissile materials.

(a) * * *

(6) A 55-gallon 1A2 steel drum, subject to the following conditions:

* * * * *

Subparts J through O—[Removed]

Subparts J, K, L, M, N, and O would be removed.

Appendix B—[Amended]

In Appendix B:

1. The title would be amended by changing the word "POLYETHYLENE" to "PLASTIC".

2. In the first and second paragraphs, the word "polyethylene" would be revised to read "plastic" wherever it appears.

3. In the second sentence of the first paragraph, the section reference "§ 173.24(d)(3)" would be revised to read "§ 173.24(e)(3)(iii)".

4. In paragraph (6), the phrase "a height of 1.2 meters (3.94 feet) on to solid concrete" would be revised to read "a height determined in accordance with § 178.603(d) of this subchapter onto a rigid nonresilient, flat and horizontal surface."

Appendix C would be added as follows:

Appendix C—Procedure for Base Level Vibration Testing

Base level vibration testing shall be conducted as follows:

1. Three sample packagings, selected at random, shall be filled and closed as for shipment. A non-hazardous material may be used in place of the hazardous material if it has essentially the same physical characteristics.

2. The three packages shall be placed on a vibrating platform that has a vertical double-amplitude (peak-to-peak displacement) of one inch. The packages should be constrained horizontally to prevent them from falling off the platform, but shall be left free to move vertically, bounce and rotate.

3. The test shall be performed for one hour at a frequency that causes the package to be raised from the vibrating platform to such a degree that a piece of material of approximately 1/16-inch (1.6 mm) thickness (such as steel strapping or paperboard) can be passed between the bottom of any package and the platform.

4. Immediately following the period of vibration, each package shall be removed from the platform, turned on its side and observed for any evidence of leakage.

5. Rupture or leakage from any of the packages constitutes failure of the test.

PART 176—CARRIAGE BY VESSEL

The authority citation for Part 176 would continue to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1806(b), 1806; 49 CFR Part 1, unless otherwise noted.

Paragraph (d) of § 176.5 would be revised as follows:

§ 176.5 Application to vessels.

* * * * *

(d) Except for transportation in bulk packagings (as defined in § 171.8 of this subchapter), the bulk carriage of hazardous materials by water is governed by 46 CFR Subchapters D, I, O and N.

* * * * *

In § 176.83, paragraph (c)(6) would be added as follows:

§ 176.83 Segregation requirements for cargo vessels and passenger vessels.

* * * * *

(c) * * *

(6) *Clear of living quarters.* "Clear of living quarters" means that the hazardous material must be located so that in the event of release of the material, leakage or vapors will not penetrate accommodations, machinery spaces or other work areas by means of entrances or other openings in bulkheads or ventilation ducts.

* * * * *

Section 176.84 would be added as follows:

§ 176.84 Other requirements for stowage and segregation for cargo vessels and passenger vessels.

(a) *General.* When Column 10c of the § 172.101 Table refers to a numbered stowage provision for water shipments, the meaning and requirements of that provision are as set forth in this section. Terms in quotation marks are defined in § 176.83.

(b) *Table of provisions:*

Code	Provisions
1	(Reserved)
2	Temperature controlled material.
3	Do not stow with high explosives.
4	(Reserved)
5	(Reserved)
6	Emergency temperature material.
7	(Reserved)
8	Glass carboys not permitted on passenger vessels.
9	Glass carboys not permitted under deck.
10	Glass bottles not permitted under deck.
11	Keep away from heat and open flame.
12	Keep cool.
13	Keep dry.
14	Metal drums only permitted under deck.
15	May be stowed in portable magazine or metal locker.
16	No other cargo may be stowed in the same hold with this material.
17	(Reserved)
18	Prohibited on any vessel carrying explosives (except explosives in Division 1.4, Compatibility group S).
19	Protect from sparks and open flames.
20	Segregation same as for corrosives.
21	Segregation same as for flammable liquids.
22	Segregation same as for flammable liquids if flash-point below 61 °C (141 °F).
23	Segregation same as for flammable liquids if flash-point between 23 °C (73 °F) and 61 °C (141 °F).
24	Segregation same as for flammable solids.
25	Shade from radiant heat.
26	Stow "away from" acids.
27	Stow "away from" alkaline compounds.
28	(Reserved)
29	Stow "away from" ammonium compounds.
30	Stow "away from" animal or vegetable oils.
31	Stow "away from" combustible materials.
32	Stow "away from" copper, its alloys and its salts.
33	Stow "away from" fluorides.
34	Stow "away from" foodstuffs.
35	Stow "away from" all odor-absorbing cargo.
36	Stow "away from" heavy metals and their compounds.
37	Stow "away from" hydrazine.
38	Stow "away from" all other corrosives.
39	Stow "away from" liquid halogenated hydrocarbons.
40	Stow "clear of living quarters".
41	Stow "away from" mercury and its compounds.
42	Stow "away from" nitric acids and perchloric acids not exceeding 50% acid by weight.
43	Stow "away from" organic materials.
44	Stow "away from" oxidizers.
45	Stow "away from" permanganates.
46	Stow "away from" powdered metals.
47	Stow "away from" sodium compounds.
48	Stow "away from" sources of heat.
49	Stow "away from" corrosives.
50	Stow "away from" sources of heat where temperatures in excess of 55 °C (131 °F) for a period of 24 hours or more will be encountered.
51	Stow "separated from" acetylene.
52	Stow "separated from" acids.
53	Stow "separated from" alkaline compounds.
54	Stow "separated from" animal or vegetable oils.
55	Stow "separated from" ammonia.
56	Stow "separated from" ammonium compounds.
57	Stow "separated from" chlorine.
58	Stow "separated from" cyanides.
59	Stow "separated from" combustible materials.
60	Stow "separated from" chlorates, chlorites, hypochlorites, nitrites, perchlorates, permanganates, and metallic powders.
61	Stow "separated from" corrosive materials.
62	Stow "separated from" diborane.
63	Stow "separated from" diethylene triamine.
64	Stow "separated from" explosives.
65	Stow "separated from" flammable substances.
66	Stow "separated from" flammable solids.
67	Stow "separated from" halides.
68	Stow "separated from" hydrogen.
69	Stow "separated from" hydrogen peroxide.
70	Stow "separated from" mercury salts.
71	Stow "separated from" nitric acid.
72	Stow "separated from" nitrogen compounds.
73	Stow "separated from" nitrogen compounds and chlorates.
74	Stow "separated from" oxidizers.
75	Stow "separated from" permanganates.
76	Stow "separated by a complete compartment or hold from" organic peroxides.
77	Stow "separated longitudinally by a complete compartment or hold from" explosives.
78	Stow "separated longitudinally by an intervening complete compartment or hold from" explosives.
79	The maximum net quantity in one package for this material shipped aboard a passenger vessel is limited to 50 pounds (22.7 kg).
80	Toy torpedoes must not be packed with other special fireworks.
81	Under deck stowage permitted only if an indicating substance such as chloropicrin has been added.
82	Under deck stowage is permitted only if containing not more than 36% by weight of hydrazine.
83	(Reserved)
84	Under deck stowage must be in well-ventilated space.
85	Under deck stowage must be in mechanically ventilated space.
86	Stow "separated by a complete compartment or hold from" explosives Class 1.3.
87	Stow "separated from" explosives except Class 1.4.
88	Stow "separated by a complete compartment or hold from" explosives except Class 1.4.
89	Segregation same as for oxidizers.
90	Stow "separated from" radioactive materials.
91	Stow "separated from" flammable solids.
92	Stow "separated from" powdered materials.
93	Stow not accessible to unauthorized persons on passenger vessels.
94	Plastic jerricans and plastic drums not permitted under deck.
95	Stow "separated from" foodstuffs.
96	Glass carboys not permitted under deck on passenger vessels.
97	Stow "away from" azides.
98	Stow "away from" all flammable materials.
99	Only new metal drums permitted on passenger vessels.

PART 178—[AMENDED]

The authority citation for Part 178 would continue to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1806, 1808; 49 CFR Part 1, unless otherwise noted.

The title to Part 178 would be revised to read:

PART 178—SPECIFICATIONS FOR PACKAGINGS

The table of contents for Part 178 is revised to read as follows:

Sec.

178.54 Specification 4B240–FLW; welded or welded and brazed cylinders with fusion-welded longitudinal seam.
178.55 Specification 4B240ET; welded and brazed cylinders made from electric resistance welded tubing.
178.56 Specification 4AA480; welded steel cylinders made of definitely prescribed steels.
178.57 Specification 4L; welded cylinders insulated.
178.58 Specification 4DA; inside containers, welded steel for aircraft use.
178.59 Specification 8; steel cylinders with approved porous filling for acetylene.
178.60 Specification 8AL; steel cylinders with approved porous filling for acetylene.
178.61 Specification 4BW; welded steel cylinders made of definitely prescribed steels with electric-arc welded longitudinal seam.
178.65 Specification 39; non-reusable (non-refillable) cylinder.
178.68 Specification 4E; welded aluminum cylinders.

Subparts D–G—[Reserved]

Subpart H—Specifications for Portable Tanks

178.245 Specification 51; steel portable tanks.
178.251 General design and construction requirements applicable to specifications 56 (§ 178.252) and 57 portable tanks (§ 178.253).
178.252 Specification 56; metal portable tanks.
178.253 Specification 57; metal portable tanks.
178.255 Specification 60; steel portable tanks.
178.270 Specification IM 101 and IM 102 steel portable tanks; general design and construction requirements.
178.271 Specification IM 101 steel portable tanks.
178.272 Specification IM 102 steel portable tanks.

Subpart I—[Reserved]

Subpart J—Specifications for Containers for Motor Vehicle Transportation

178.315 Specification MC 200; containers for liquid nitroglycerin, desensitized liquid nitroglycerin or diethylene glycol dinitrate.
178.318 Specification MC 201; container for detonators and percussion caps.
178.337 Specification MC 331; cargo tanks constructed of steel, primarily for transportation of compressed gases as defined in the Compressed Gas Section.
178.338 Specification MC 338; insulated cargo tank.
178.340 General design and construction requirements applicable to specifications MC 306 (§ 178.341), MC 307 (§ 178.342), and MC 312 (§ 178.343) cargo tanks.
178.341 Specification MC 306; cargo tanks.
178.342 Specification MC 307; cargo tanks.
178.343 Specification MC 312; cargo tanks.

Subpart K—Specifications for Packagings for Radioactive Materials

178.350 Specification 7A; general packaging. Type A.
178.352 Specification 6L; metal packaging.
178.354 Specification 6M; metal packaging.
178.356 Specification 20PF; phenolic-foam insulated, metal overpack.
178.358 Specification 21PF; fire and shock resistant, phenolic-foam insulated, metal overpack.
178.360 Specification 2R; inside containment vessel.
178.362 Specification 20WC; wooden protective jacket.
178.364 Specification 21WC; wooden-steel protective overpack.

Subpart L—Non-bulk Performance-oriented Packaging Standards

178.500 Purpose, scope and definitions.
178.502 Identification codes for packagings.
178.503 Marking of packagings.
178.504 Standards for steel drums.
178.505 Standards for aluminum drums.
178.506 Standards for metal drums other than steel or aluminum.
178.507 Standards for plywood drums.
178.508 Standards for fiber drums.
178.509 Standards for plastic drums and jerricans.
178.510 Standards for wooden barrels.
178.511 Standards for steel jerricans.
178.512 Standards for steel or aluminum boxes.
178.513 Standards for boxes of natural wood.
178.514 Standards for plywood boxes.
178.515 Standards for reconstituted wood boxes.
178.516 Standards for fiberboard boxes.
178.517 Standards for plastic boxes.
178.518 Standards for woven plastic bags.
178.519 Standards for plastic film bags.
178.520 Standards for textile bags.
178.521 Standards for paper bags.
178.522 Standards for composite packagings with inner plastic receptacles.
178.523 Standards for composite packagings with inner glass, porcelain, or stoneware receptacles.

Subpart M—Testing of Non-bulk Packagings and Packages

178.600 Purpose and scope.
178.601 General requirements.
178.602 Preparation of packagings and packages for testing.
178.603 Drop test.
178.604 Leakproofness test.
178.605 Hydrostatic pressure test.
178.606 Stacking test.
178.607 Cooperage test for bung-type wooden barrels.
178.608 Chemical compatibility test for plastic receptacles.

Section 178.0–2 would be revised to read as follows:

§ 178.0–2 Applicability and manufacturers' responsibility.

(a) *Applicability.* Any person who performs a function prescribed in this part shall perform that function in accordance with this part.

(b) *Specification markings.* When this part requires that a packaging be marked with a DOT specification or UN standard marking (for example, DOT–3AL 1800–1234–XY, UN 1A1/Y1.4/150/85) compliance with that requirement is the responsibility of the manufacturer (see § 171.8 of this subchapter for definition of "manufacturer") of the packaging. Except as otherwise provided in this section, marking of the packaging by the manufacturer with the appropriate DOT or UN markings is the certification by the manufacturer that—

(1) All requirements of the DOT specification or the UN standard, including performance tests, are met; and

(2) All functions performed by the manufacturer conform to requirements specified in this part.

(c) *General requirements for packagings.* Manufacturers of packagings shall comply with general requirements for packagings prescribed in Subpart B of Part 173 (particularly, § 173.24) of this subchapter to the extent that those requirements apply to the design, construction and suitability for use of the specification or standard to which the packaging is manufactured.

(d) *Notification.* Except as specifically provided in §§ 178.337–18 and 178.340–10, the manufacturer of a packaging shall inform in writing each person to whom that packaging is transferred of all requirements of this part not met at the time of transfer, and all actions which need to be taken for the packaging to conform to the requirements of this part. This notice must also include the type and dimensions of any closures needed to satisfy performance test requirements. Copies of these written statements shall be retained by the manufacturer for at least one year from date of issuance and must be open to inspection by a representative of the Department.

(e) Except as provided in paragraph (d) of this section, packagings which do not conform to the applicable specifications or standards in this part may not be marked to indicate such conformance.

Section 178.0–3 would be revised to read as follows:

§ 178.0–3 Marking of Packagings.

(a) Each packaging manufactured to a DOT specification or a UN standard shall be marked as follows:

(1) In an unobstructed area, with letters, and numerals identifying the standards or specification (e.g. UN 1A1, DOT 4B240ET, etc.).

(2) With the name and address or symbol of the person making the mark.

Symbols, if used, must be registered with the Director, OHMT.

(3) The markings must be stamped, embossed, burned, printed or otherwise marked on the packaging to provide adequate accessibility, permancy, contrast, and legibility so as to be readily apparent and understood.

(4) Unless otherwise specified, letters and numerals must be at least 12.0mm (0.47 inches) in height except that for packagings of less than or equal to 30 liters (7.9 gallons) capacity for liquids or 30 kilograms (66.1 pounds) capacity for solids the height must be at least 6.0mm (0.24 inches).

(b) Packagings may be marked with the United Nations symbol and packaging identification code as provided in this subchapter, in the ICAO Technical Instructions or in Annex 1 to the IMDG Code, provided the person applying these marks has established that the packaging conforms to the applicable provisions of this subchapter, the ICAO Technical Instructions or Annex 1 to the IMDG Code, respectively.

(1) If an indication of the State in whose territory the specified tests have been carried out, or of the State authorizing the allocation of the mark, is required, the letters "USA" shall be used.

(2) If an indication of the name of the manufacturer or other identification of the packaging as specified by the competent authority is required, the name and address or symbol of the person making the mark shall be entered. Symbols, if used, must be registered with the Director, OHMT. Duplicate symbols are not authorized.

(3) Packagings manufactured to UN standards in accordance with this subchapter shall be marked as prescribed in § 178.503.

Subpart A—[Removed and Reserved]

Subpart A of Part 178 would be removed and reserved.

Subpart B—[Amended]

In Subpart B, § 178.34 would be redesignated as § 178.360 and moved to Subpart K. With the exception of §§ 178.33 and 178.33a, the remaining sections in Subpart B would be removed.

The title of § 178.33 would be revised to read as follows:

§ 178.33 Specification 2P; inner nonrefillable metal receptacles.

* * * * *

The title to § 178.33a would be revised to read as follows:

§ 178.33a Specification 2Q; inner nonrefillable metal receptacles.

* * * * *

Subpart D—[Amended]

In Subpart D, §§ 178.103, 178.104, 178.120 and 178.121 would be moved to Subpart K and be redesignated as §§ 178.352, 178.354, 178.356 and 178.358, respectively. Then Subpart D would be removed and reserved.

Subpart E—[Amended]

In Subpart E, §§ 178.194 and 178.195 would be moved to Subpart K and be redesignated as §§ 178.362 and 178.364, respectively. Then Subpart E would be removed and reserved.

Subparts F and G—[Removed and Reserved]

Subparts F and G would be removed and reserved.

Subpart H—Specifications for Portable Tanks

In § 178.270–11, paragraphs (c) (1) and (2) would be revised to read as follows:

§ 178.270–11 Pressure and vacuum relief devices.

* * * * *

(c) *Pressure settings of relief devices*—(1) *Primary pressure relief devices.* The primary relief device required by paragraph (a) of this section must be set to function in the range of—

(i) No less than 67 percent and no greater than 83 percent of test pressure for tanks hydrostatically tested under § 178.270–13(a) at a pressure below 66 psig (455.1 kPa). Spring-loaded pressure relief valves must close after discharge at a pressure not less than 80 percent of start-to-discharge pressure.

(ii) No less than 67 percent and no greater than 74 percent of test pressure for tanks hydrostatically tested under § 178.270–13(a) at a pressure of 66 psig (455.1 kPa) or higher. Spring-loaded pressure relief valves must close after discharge at a pressure not less than 90 percent of start to discharge pressure.

(2) *Emergency pressure relief devices.* Each frangible disc, other than one used as a primary relief device in accordance with paragraph (b)(2) of this section, must be designed to burst at a pressure greater than 83 percent of and less than or equal to tank hydrostatic test pressure. Each spring-loaded pressure relief valve used as an emergency pressure relief device must be set to operate at no less than 83 percent of hydrostatic test pressure and be fully open at test pressure.

* * * * *

The title to Subpart K would be revised to read as follows:

Subpart K—Specifications for Packagings for Radioactive Materials

A new Subpart L would be added to read as follows:

Subpart L—Non-Bulk Performance-Oriented Packaging Standards

§ 178.500 Purpose, scope and definitions.

(a) This subpart prescribes certain requirements for non-bulk packagings for hazardous materials. Standards for these packagings are based on the UN Recommendations.

(b) Terms used in this subpart are defined in § 171.8 of this subchapter.

§ 178.502 Identification codes for packagings.

(a) Identification codes for designating types of packagings consist of the following:

(1) A numeral indicating the type of packaging, as follows:

(i) "1" means a drum.
(ii) "2" means a wooden barrell.
(iii) "3" means a jerrican.
(iv) "4" means a box.
(v) "5" means a bag.
(vi) "6" means a composite packaging.
(vii) "7" means a pressure receptacle.

(2) A capital letter indicating the material of construction, as follows:

(i) "A" means steel (all types and surface treatments).
(ii) "B" means aluminum.
(iii) "C" means natural wood.
(iv) "D" means plywood.
(v) "F" means reconstituted wood.
(vi) "G" means fiberboard.
(vii) "H" means plastic.
(viii) "L" means textile.
(ix) "M" means paper, multiwall.
(x) "N" means metal (other than steel or aluminum).
(xi) "P" means glass, porcelain or stoneware.

(3) A numeral indicating the category of packaging within the type to which the packaging belongs. For example, for steel drums ("1A"), "1" indicates a non-removable head drum (i.e., "1A1") and "2" indicates a removable head drum (i.e., "1A2").

(b) For composite packagings, two capital letters are used in sequence in the second position of the code, the first indicating the material of the inner receptacle and the second, that of the outer packaging. For example, a plastic receptacle in a steel drum is designated "6HA1".

(c) For combination packagings, only the code number for the outer packaging is used.

(d) Identification codes are set forth in the standards for packagings in §§ 178.504 through 178.523.

§ 178.503 Marking of packagings.

(a) The manufacturer shall mark every package that is required to conform to a UN standard of this subpart in a durable and clearly visible manner, with the following information and in the sequence presented:

(1) The United Nations symbol as illustrated in paragraph (d) of this section (for metal receptacles, the letters UN may be applied in place of the symbol);

(2) A packaging identification code designating the type of packaging, the material of construction and, when appropriate, the category of packaging under §§ 178.504 through 178.523 within the type to which the packaging belongs;

(3) A letter identifying the performance standard under which the packaging has been successfully tested, as follows:

(i) X—for packagings meeting Packing Group I, II and III tests;

(ii) Y—for packagings meeting Packing Group II and III tests; or

(iii) Z—for packagings only meeting Packing Group III tests;

(4) A designation of the specific gravity or mass for which the packaging has been tested, as follows:

(i) For packaging without inner packagings intended to contain liquids (except viscous liquids), the designation shall be the specific gravity rounded down to the first decimal but may be omitted when the specific gravity does not exceed 1.2; and

(ii) For packagings intended to contain viscous liquids, solids, or inner packagings, the designation must be the maximum gross mass in kilograms;

(5) Either a letter "S" designating that the packaging is intended only for the transport of solids or inner packagings, or the test pressure in kilopascals rounded off to the nearest 10 kilopascals of the hydrostatic pressure test that the packaging has successfully passed;

(6) The last two digits of the year of manufacture. Packagings of types 1H and 3H shall also be marked with the month of manufacture in any appropriate manner; this may be marked on the packaging in a different place from the remainder of the markings;

(7) The letters "USA" (indicating that the packaging was marked pursuant to the provisions of this subchapter);

(8) The name and address or symbol of the person applying the marks required by this section. Symbols, if used, must be registered in advance with the Director, OHMT;

(9) For metal or plastic drums or jerricans intended for reuse the minimum thickness of the packaging material, expressed in millimeters and abbreviated "mm", and

(10) For drums intended as packagings for nitric acid, the tare weight in kilograms preceded by the letters TW.

(b) For a reusable packaging likely to undergo a reconditioning process, the markings required in paragraphs (a)(1) through (a)(6) and (a)(9) of this section shall be applied in a permanent manner (e.g., by embossment) able to withstand the reconditioning process. For a packaging with a removable head, the markings may not be applied to the removable head.

(c) If a package is reconditioned, it shall be marked by the reconditioner near the marks required in paragraphs (a) (1) through (a)(6) of this section with the following additional information:

(1) The name of the country in which the reconditioning was performed (in the United States, use the letters "USA";

(2) The name and address or symbol of the reconditioner. Symbols, if used, shall be registered in advance with the Director, OHMT;

(3) The month and last two digits of the year of reconditioning;

(4) The letter "R"; and

(5) For every packaging successfully passing a leakproofness test, the additional letter "L".

(d) The following are examples of symbols and required markings:

(1) The United Nations symbol is:

(2) Examples of markings for a new packaging are as follows:

(i) For a fiberboard box designed to contain an inner receptacle:

4G/Y145/S/83—(as in § 178.503(a) (1), (2), (3), (4), (5) and (6))

USA/RA—(as in § 178.503(a) (7) and (8))

(ii) For a steel drum designed to contain liquids:

UN 1A1/Y1.4/150/83—(as in § 178.503(a) (1), (2), (3), (4), (5) and (6))

USA/VL824—(as in § 178.503 1mm(a) (7), (8) and (9))

(iii) For a steel drum to transport solids, viscous liquids or inner packagings:

UN 1A2/Y150/S/83—(as in § 178.503(a) (1), (2), (3), (4), (5) and (6))

USA/VL825—(as in § 178.503(a) (7) and (8))

(3) Examples of markings for reconditioned packagings are as follows:

USA/RB/10–85RL—(as in § 178.503(c) (1), (2), (3) and (4))

§ 178.504 Standards for steel drums.

(a) The following are identification codes for steel drums:

(1) 1A1 for a non-removable head steel drum; and,

(2) 1A2 for a removable head steel drum.

(b) Construction requirements for steel drums are as follows:

(1) Body and heads shall be constructed of steel sheet of suitable type and adequate thickness in relation to the capacity and intended use of the drum.

(2) Body seams shall be welded on drums designed to contain more than 40 liters (10.6 gallons) of liquids. Body seams shall be mechanically seamed or welded on drums intended to contain only solids or 40 liters (10.6 gallons) or less of liquids.

(3) Chimes shall be mechanically seamed or welded. Separate reinforcing rings may be applied.

(4) The body of a drum of a capacity greater than 60 liters (15.9 gallons) must, in general, have at least two expanded rolling hoops, or alternatively, at least two separate rolling hoops. If there are separate rolling hoops, they shall be fitted tightly on the body and so secured that they cannot shift. Rolling hoops may not be spot welded.

(5) Openings for filling, emptying and venting in the bodies or heads of non-removable head (1A1) drums may not exceed 7.0 centimeters (2.76 inches) in diameter. Drums with larger openings are considered to be of the removable head type (1A2). Closures for openings in the bodies and heads of drums shall be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Closure flanges shall be mechanically seamed or welded in place. Gaskets or other sealing elements shall be used with closures unless the closure is inherently leakproof.

(6) Closure devices for removable head drums shall be so designed and applied that they will remain secure and drums will remain leakproof under normal conditions of transport. Gaskets or other sealing elements shall be used with all removable heads.

(7) If materials used for body, heads, closures, and fittings are not in themselves compatible with the contents to be transported, suitable internal protective coatings or treatments shall be applied. These coatings or treatments shall retain their protective properties under normal conditions of transport.

(8) Maximum capacity of drum: 450 liters (118.9 gallons).

(9) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.505 Standards for aluminum drums.

(a) The following are the identification codes for aluminum drums:

(1) 1B1 for a non-removable head aluminum drum; and

(2) 1B2 for a removable head aluminum drum.

(b) Construction requirements for aluminum drums are as follows:

(1) Body and heads shall be constructed of aluminum at least 99 percent pure or an aluminum base alloy. Material shall be of suitable type and adequate thickness in relation to the capacity and the intended use of the drum.

(2) All seams shall be welded. Chime seams, if any, shall be reinforced by the application of separate reinforcing rings.

(3) The body of a drum of a capacity greater than 60 liters (15.9 gallons) must, in general, have at least two expanded rolling hoops, or alternatively, at least two separate rolling hoops. If there are separate rolling hoops, the hoops shall be fitted tightly on the body and so secured that they cannot shift. Rolling hoops shall not be spot welded.

(4) Openings for filling, emptying, or venting in the bodies or heads of non-removable head (1B1) drums may not exceed 7.0 centimeters (2.76 inches) in diameter. Drums with larger openings are considered to be of the removable head type (1B2). Closures for openings in the bodies and heads of drums shall be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Closure flanges shall be welded in place so that the weld provides a leakproof seam. Gaskets or other sealing elements shall be used with closures unless the closure is inherently leakproof.

(5) Closure devices for removable head drums shall be so designed and applied that they remain secure and drums remain leakproof under normal conditions of transport. Gaskets or other sealing elements shall be used with all removable heads.

(6) Maximum capacity of drum: 450 liters (118.9 gallons).

(7) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.506 Standards for metal drums other than steel or aluminum.

(a) The following are the identification codes for metal drums other than steel or aluminum:

(1) 1N1 for a non-removable head metal drum.

(2) 1N2 for a removable head metal drum.

(b) Construction requirements for metal drums other than steel or aluminum are as follows:

(1) Body and heads shall be constructed of metal (other than steel or aluminum) of suitable type and adequate thickness in relation to the capacity and the intended use of the drum.

(2) All seams shall be welded. Chime seams, if any, shall be reinforced by the application of separate reinforcing rings.

(3) The body of a drum of a capacity greater than 60 liters (15.85 gallons) must, in general, have at least two expanded rolling hoops, or alternatively, at least two separate rolling hoops. If there are separate rolling hoops, the hoops shall be fitted tightly on the body and so secured that they cannot shift. Rolling hoops shall not be spot welded.

(4) Openings for filling, emptying, or venting in the bodies or heads of non-removable head (1N1) drums may not exceed 7.0 centimeters (2.76 inches) in diameter. Drums with larger openings are considered to be of the removable head type (1N2). Closures for openings in the bodies and heads of drums shall be so designed and applied that they will remain secure and leakproof under normal conditions of transport. Closure flanges shall be welded in place so that the weld provides a leakproof seam. Gaskets or other sealing elements shall be used with closures unless the closure is inherently leakproof.

(5) Closure devices for removable head drums shall be so designed and applied that they remain secure and drums remain leakproof under normal conditions of transport. Gaskets or other sealing elements shall be used with all removable heads.

(6) Maximum capacity of drum: 450 liters (118.9 gallons).

(7) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.507 Standards for plywood drums.

(a) The identification code for a plywood drum is 1D.

(b) Construction requirements for plywood drums are as follows:

(1) The wood used must be well-seasoned, commercially dry and free from any defect likely to lessen the effectiveness of the drum for the purpose intended. A material other than plywood may be used for the manufacture of the heads, if it is of strength and durability at least equivalent to the plywood.

(2) At least two-ply plywood shall be used for the body and at least three-ply plywood for the heads; the plies shall be firmly glued together, with their grains crosswise.

(3) The body and heads of the drum and their joints must be of a design appropriate to the capacity of the drum and its intended use.

(4) In order to prevent sifting of the contents, lids shall be lined with kraft paper or some other equivalent material which shall be securely fastened to the lid and extend to the outside along its full circumference.

(5) Maximum capacity of drum: 250 liters (66.0 gallons).

(6) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.508 Standards for fiber drums.

(a) The identification code for a fiber drum is 1G.

(b) Construction requirements for fiber drums are as follows:

(1) The body of the drum shall be constructed of multiple plies of heavy paper or fiberboard (without corrugations) firmly glued or laminated together and may include one or more protective layers of bitumen, waxed kraft paper, metal foil, plastic material, or similar materials.

(2) Heads must be of natural wood, fiberboard, metal, plywood or plastic material and may include one or more protective layers of bitumen, waxed kraft paper, metal foil, plastic material, or similar material.

(3) The body and heads of the drum and their joints must be of a design appropriate to the capacity and intended use of the drum.

(4) The assembled packaging must be sufficiently water-resistant so as not to delaminate under normal conditions of transport.

(5) Maximum capacity of drum: 450 liters (118.9 gallons).

(6) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.509 Standards for plastic drums and jerricans.

(a) The following are identification codes for plastic drums and jerricans:

(1) 1H1 for a non-removable head plastic drum;

(2) 1H2 for a removable head plastic drum;

(3) 3H1 for a non-removable head jerrican; and

(4) 3H2 for a removable head jerrican.

(b) Construction requirements for plastic drums and jerricans are as follows:

(1) The packaging shall be manufactured from suitable plastic material and be of adequate strength in relation to its capacity and intended use. No used material other than production residues or regrind from the same manufacturing process may be used. The packaging must be adequately resistant to aging and to degradation caused either by the substance contained or by ultra-violet radiation. Any permeation of

the substance contained must not constitute a danger under normal conditions of transport.

(2) If protection against ultra-violet radiation is required, it shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives must be compatible with the contents and remain effective throughout the life of the packaging. Where use is made of carbon black, pigments or inhibitors other than those used in the manufacture of the design type, retesting may be waived if the carbon black content does not exceed 2 percent by mass or if the pigment content does not exceed 3 percent by mass; the content of inhibitors of ultra-violet radiation is not limited.

(3) Additives serving purposes other than protection against ultraviolet radiation may be included in the composition of the plastic material provided they do not adversely affect the chemical and physical properties of the packaging material.

(4) The wall thickness at every point of the packaging must be appropriate to its capacity and its intended use, taking into account the stresses to which each point is liable to be exposed.

(5) Openings for filling, emptying and venting in the bodies or heads of non-removable head (1H1) drums and jerricans (3H1) may not exceed 7.0 centimeters (2.76 inches) in diameter. Drums and jerricans with larger openings are considered to be of the removable head type (1H2 and 3H2). Closures for openings in the bodies or heads of drums and jerricans shall be so designed and applied that they remain secure and leakproof under normal conditions of transport. Gaskets or other sealing elements shall be used with closures unless the closure is inherently leakproof.

(6) Closure devices for removable head drums and jerricans shall be so designed and applied that they remain secure and leakproof under normal conditions of transport. Gaskets shall be used with all removable heads unless the drum or jerrican design is such that when the removable head is properly secured, the drum or jerrican is inherently leakproof.

(7) Maximum capacity of drums and jerricans: 1H1, 1H2: 450 liters (118.9 gallons); 3H1, 3H2: 60 liters (15.9 gallons).

(8) Maximum net mass: 1H1, 1H2: 400 kg (881.8 pounds); 3H1, 3H2: 120 kg (264.6 pounds).

§ 178.510 Standards for wooden barrels.

(a) The following are identification codes for wooden barrels:

(1) 2C1 for a bung type wooden barrel; and

(2) 2C2 for a slack type (removable head) wooden barrel.

(b) Construction requirements for wooden barrels are as follows:

(1) The wood used must be of good quality, straight-grained, well-seasoned and free from knots, bark, rotten wood, sapwood or other defects likely to lessen the effectiveness of the barrel for the purpose intended.

(2) The body and heads must be of a design appropriate to the capacity and intended use of the barrel.

(3) Staves and heads shall be sawn or cleft with the grain so that no annual ring extends over more than half the thickness of a stave or head.

(4) Barrel hoops must be of steel or iron of good quality. The hoops of 2C2 barrels may be of a suitable hardwood.

(5) For wooden barrels 2C1, the diameter of the bung-hole may not exceed half the width of the stave in which it is placed.

(6) For wooden barrels 2C2, heads must fit tightly into crozes.

(7) Maximum capacity of barrel: 250 liters (66.0 gallons)

(8) Maximum net mass: 400 kilograms (881.8 pounds)

§ 178.511 Standards for steel jerricans.

(a) The following are identification codes for steel jerricans:

(1) 3A1 for a non-removable head jerrican; and

(2) 3A2 for a removable head jerrican.

(b) Construction requirements for steel jerricans are as follows:

(1) Body and heads shall be constructed of steel sheet of suitable type and adequate thickness in relation to the capacity of the jerrican and intended use.

(2) Chimes of all jerricans shall be mechanically seamed or welded. Body seams of jerricans intended to carry more than 40 liters (10.6 gallons) of liquid shall be welded. Body seams of jerricans intended to carry 40 liters (10.6 gallons) or less shall be mechanically seamed or welded.

(3) Openings in jerricans (3A1) may not exceed 7.0 centimeters (2.76 inches) in diameter. Jerricans with larger openings are considered to be of the removable head type. Closures shall be so designed that they remain secure and leakproof under normal conditions of transport. Gaskets or other sealing elements shall be used with closures, unless the closure is inherently leakproof.

(4) If materials used for body, heads, closures and fittings are not in themselves compatible with the contents to be transported, suitable internal protective coatings or treatments shall be applied. These coatings or treatments must retain their protective properties under normal conditions of transport.

(5) Maximum capacity of jerrican: 60 liters (15.9 gallons).

(6) Maximum net mass: 120 kilograms (264.6 pounds).

§ 178.512 Standards for steel or aluminum boxes.

(a) The following are identification codes for steel or aluminum boxes:

(1) 4A1 for an unlined and uncoated steel box;

(2) 4A2 for a steel box with inner liner or coating;

(3) 4B1 for an unlined and uncoated aluminum box; and

(4) 4B2 for an aluminum box with inner liner or coating.

(b) Construction requirements for steel or aluminum boxes are as follows:

(1) The strength of the metal and the construction of the box must be appropriate to the capacity and intended use of the box.

(2) Boxes 4A2 and 4B2 shall be lined with fiberboard or felt packing pieces, as required, or shall have an inner liner or coating of suitable material. If a double seamed metal liner is used, steps shall be taken to prevent the ingress of substances, particularly explosives, into the recesses of the seams.

(3) Closures may be of any suitable type, and must remain secure under normal conditions of transport.

(4) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.513 Standards for boxes of natural wood.

(a) The following are the identification codes for boxes of natural wood:

(1) 4C1 for an ordinary box; and

(2) 4C2 for a box with sift-proof walls.

(b) Construction requirements for boxes of natural wood are as follows:

(1) The wood used must be well-seasoned, commercially dry and free from defects that would materially lessen the strength of any part of the box. The strength of the material used and the method of construction must be appropriate to the capacity and intended use of the box. The tops and bottoms may be made of water-resistant reconstituted wood such as hard board, particle board or other suitable type.

(2) Each part of the 4C2 box must be one piece or equivalent. Parts are considered equivalent to one piece when one of the following methods of glued assembly is used: Linderman joint, tongue and groove joint, ship lap or rabbet joint, or butt joint with at least

two corrugated metal fasteners at each joint.

(3) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.514 Standards for plywood boxes.

(a) The identification code for a plywood box is 4D.

(b) Construction requirements for plywood boxes are as follows:

(1) Plywood used must be at least 3 ply. It shall be made from well-seasoned rotary cut, sliced or sawn veneer, commercially dry and free from defects that would materially lessen the strength of the box. The strength of the material used and the method of construction must be appropriate to the capacity and intended use of the box. All adjacent plies shall be glued with water-resistant adhesive. Other suitable materials may be used together with plywood in the construction of boxes. Boxes shall be nailed or secured to corner posts or ends or assembled with other equally suitable devices.

(2) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.515 Standards for reconstituted wood boxes.

(a) The identification code for a reconstituted wood box is 4F.

(b) Construction requirements for reconstituted wood boxes are as follows:

(1) The walls of boxes shall be made of water-resistant, reconstituted wood such as hardboard, particle board, or other suitable type. The strength of the material used and the method of construction must be appropriate to the capacity of the boxes and their intended use.

(2) Other parts of the box may be made of other suitable materials.

(3) Boxes shall be securely assembled by means of suitable devices.

(4) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.516 Standards for fiberboard boxes.

(a) The identification code for a fiberboard box is 4G.

(b) Construction requirements for fiberboard boxes are as follows:

(1) Strong, solid or double-faced corrugated fiberboard (single or multiwall) shall be used, appropriate to the capacity and intended use of the box. The water resistance of the outer surface must be such that the increase in mass, as determined in a test carried out over a period of 30 minutes by the Cobb method of determining water absorption, is not greater than 155 grams per square meter (0.0316 pounds per square foot) -see ISO International Standard 535–1976 (E). It must have proper bending qualities. Fiberboard shall be cut, creased without scoring, and slotted so as to permit assembly without cracking, surface breaks, or undue bending. The fluting of corrugated fiberboard shall be firmly glued to the facings.

(2) The ends of boxes may have a wooden frame or be entirely of wood. Reinforcements of wooden battens may be used.

(3) Manufacturing joints in the body of boxes shall be taped, lapped and glued, or lapped and stitched with metal staples. Lapped joints shall have an appropriate overlap. Where closing is effected by gluing or taping, a water-resistant adhesive shall be used.

(4) Boxes shall be designed so as to provide a snug fit to the contents.

(5) Maximum net mass: 400 kilograms (881.8 pounds).

§ 178.517 Standards for plastic boxes.

(a) The following are identification codes for plastic boxes:

(1) 4H1 for an expanded plastic box; and

(2) 4H2 for a solid plastic box.

(b) Construction requirements for plastic boxes are as follows:

(1) The box shall be manufactured from suitable plastic material and be of adequate strength in relation to its capacity and intended use. The box must be adequately resistant to ageing and to degradation caused either by the substance contained or by ultraviolet radiation.

(2) An expanded plastic box must consist of two parts made of a moulded expanded plastic material: a bottom section containing cavities for the inner receptacles, and a top section covering and interlocking with the bottom section. The top and bottom sections shall be so designed that the inner receptacles fit snugly. The closure cap for any inner receptacle may not be in contact with the inside of the top section of the box.

(3) For transportation, an expanded plastic box shall be closed with a self-adhesive tape having sufficient tensile strength to prevent the box from opening. The adhesive tape must be weather resistant and its adhesive compatible with the expanded plastic material of the box. Other closing devices at least equally effective may be used.

(4) For solid plastic boxes, protection against ultra-violet radiation, if required, shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives must be compatible with the contents and remain effective throughout the life of the box. Where use is made of carbon black pigment or inhibitors other than those used in the manufacture of the tested design type, retesting may be waived if the carbon black content does not exceed 2 percent by mass or if the pigment content does not exceed 3 percent by mass; the content of inhibitors of ultraviolet radiation is not limited.

(5) Additives serving purposes other than protection against ultraviolet radiation may be included in the composition of the plastic material if they do not adversely affect the material of the box. Addition of these additives does not change the design type.

(6) Solid plastic boxes must have closure devices made of a suitable material of adequate strength and so designed as to prevent the box from unintentional opening.

(7) Maximum net mass 4H1: 60 kg (132.3 pounds); 4H2: 400 kg (881.8 pounds).

§ 178.518 Standards for woven plastic bags.

(a) The following are identification codes for woven plastic bags:

(1) 5H1 for an unlined or non-coated woven plastic bag;

(2) 5H2 for a sift proof woven plastic bag; and

(3) 5H3 for a water-resistant woven plastic bag.

(b) Construction requirements for woven plastic fabric bags are as follows:

(1) Bags shall be made from stretched tapes or monofilaments of a suitable plastic material. The strength of the material used and the construction of the bag must be appropriate to the capacity and intended use of the bag.

(2) If the fabric is woven flat, the bags shall be made by sewing or some other method ensuring closure of the bottom and one side. If the fabric is tubular, the bag shall be closed by sewing, weaving, or some other equally strong method of closure.

(3) Bags, sift-proof, 5H2 shall be made sift-proof by appropriate means such as use of paper or a plastic film bonded to the inner surface of the bag or one or more separate inner liners made of paper or plastic material.

(4) Bags, water-resistant, 5H3: To prevent the entry of moisture, the bag shall be made waterproof by appropriate means, such as separate inner liners of water-resistant paper (e.g., waxed kraft paper, double-tarred kraft paper or plastic-coated kraft paper), or plastic film bonded to the inner or outer surface of the bag, or one or more inner plastic liners.

(5) Maximum net mass: 50 kilograms (110.2 pounds).

§ 178.519 Standards for plastic film bags.

(a) The identification code for a plastic film bag is 5H4.

(b) Construction requirements for plastic film bags are as follows:

(1) Bags shall be made of a suitable plastic material. The strength of the material used and the construction of the bag must be appropriate to the capacity and the intended use of the bag. Joints and closures must be capable of withstanding pressures and impacts liable to occur under normal conditions of transportation.

(2) Maximum net mass: 50 kilograms (110.2 pounds).

§ 178.520 Standards for textile bags.

(a) The following are identification codes for textile bags:

(1) 5L1 for an unlined or non-coated textile bag;

(2) 5L2 for a sift-proof textile bag; and

(3) 5L3 for a water-resistant textile bag.

(b) Construction requirements for textile bags are as follows:

(1) The textiles used must be of good quality. The strength of the fabric and the construction of the bag must be appropriate to the capacity and intended use of the bag.

(2) Bags, sift-proof, 5L2: The bag shall be made sift-proof, by appropriate means, such as by the use of paper bonded to the inner surface of the bag by a water-resistant adhesive such as bitumen, plastic film bonded to the inner surface of the bag, or one or more inner liners made of paper or plastic material.

(3) Bags, water-resistant, 5L3: To prevent entry of moisture, the bag shall be made waterproof by appropriate means, such as by the use of separate inner liners of water-resistant paper (e.g., waxed kraft, paper,. tarred paper, or plastic-coated kraft paper), or plastic film bonded to the inner surface of the bag, or one or more inner liners made of plastic material.

(4) Maximum net mass: 50 kilograms (110.2 pounds).

§ 178.521 Standards for paper bags.

(a) The following are identification codes for paper bags:

(1) 5M1 for a multiwall paper bag; and

(2) 5M2 for a multiwall water-resistant paper bag.

(b) Construction requirements for paper bags are as follows:

(1) Bags shall be made of a suitable kraft paper, or of an equivalent paper with at least three plies. The strength of the paper and the construction of the bag must be appropriate to the capacity and intended use of the bag. Seams and closures must be sift-proof.

(2) Paper bags 5M2: To prevent the entry of moisture, a bag of four plies or more shall be made water-proof by the use of either a water-resistant ply as one of the two outermost plies or a waterresistant barrier made of a suitable protective material between the two outermost plies. A 5M2 bag of three plies shall be made waterproof by the use of a water-resistant ply as the outermost ply. When there is danger of the lading reacting with moisture, or when it is packed damp, a water-resistant ply or barrier shall be placed next to the substance. Seams and closures must be waterproof.

(3) Maximum net mass: 50 kilograms (110.2 pounds).

§ 178.522 Standards for composite packagings with inner plastic receptacles.

(a) The following are the identification codes for composite packagings with inner plastic receptacles:

(1) 6HA1 for a plastic receptacle within a protective steel drum;

(2) 6HA2 for a plastic receptacle within a protective steel crate or box;

(3) 6HB1 for a plastic receptacle within a protective aluminum drum.

(4) 6HB2 for a plastic receptacle within a protective aluminum crate or box.

(5) 6HC for a plastic receptacle within a protective wooden box.

(6) 6HD1 for a plastic receptacle within a protective plywood drum;

(7) 6HD2 for a plastic receptacle within a protective plywood box;

(8) 6HG1 for a plastic receptacle within a protective fiber drum;

(9) 6HG2 for a plastic receptacle within a protective fiberboard box; and

(10) 6HH for a plastic receptacle within a protective plastic drum.

(b) Construction requirements for composite packagings with inner receptacles of plastic are as follows:

(1) Inner receptacles shall be constructed under the applicable construction requirements prescribed in § 178.509(b) (1) through (7).

(2) The inner plastic receptacle must fit snugly inside the outer packaging which must be free of any projections which may abrade the plastic material.

(3) Outer packagings shall be constructed as follows:

(i) 6HA1 or 6HB1: Protective packaging must conform to the requirements for steel drums in § 178.504(b), or aluminum drums in § 178.505(b).

(ii) 6HA2 or 6HB2: Protective packagings with steel or aluminum crate must conform to the requirements for steel or aluminum boxes found in § 178.512(b).

(iii) 6HC protective packaging must conform to the requirements for wooden boxes in § 178.513(b).

(iv) 6HD1: Protective packaging must conform to the requirements for plywood drums, in § 178.507(b).

(v) 6HD2: Protective packaging must conform to the requirements of plywood boxes, in § 178.514(b).

(vi) 6HG1: Protective packaging must conform to the requirements for fiber drums, in § 178.508(b).

(vii) 6HG2: protective packaging must conform to the requirements for fiberboard boxes, in § 178.516(b).

(viii) 6HH: Protective packaging must conform to the requirements for plastic drums, § 178.509(b).

(4) Maximum capacity of inner receptacles is as follows: 6HA1, 6HB1, 6HD1, 6HG1, 6HH—250 liters (66.0 gallons); 6HA2, 6HB2, 6HC, 6HD2, 6HG2—60 liters (15.9 gallons).

(5) Maximum net mass is as follows: 6HA1, 6HB1, 6HD1, 6HG1, 6HH—400 kg (881.8 pounds); 6HB2, 6HC, 6HD2, 6HG2—75 kg (165.4 pounds).

§ 178.523 Standards for composite packagings with inner glass, porcelain, or stoneware receptacles.

(a) The following are identification codes for composite packagings with inner receptacles of glass, porcelain, or stoneware:

(1) 6PA1 for glass, porcelain or stoneware receptacles within a protective steel drum;

(2) 6PA2 for glass, porcelain or stoneware receptacles within a protective steel crate or box;

(3) 6PB1 for glass, porcelain or stoneware receptacles within a protective aluminum drum;

(4) 6PB2 for glass, porcelain, or stoneware receptacles within a protective aluminum crate or box;

(5) 6PC for glass, porcelain, or stoneware receptacles within a protective wooden box;

(6) 6PD1 for glass, porcelain or stoneware receptacles within a protective plywood drum;

(7) 6PD2 for glass, porcelain, or stoneware receptacles within a protective wickerwork hamper;

(8) 6PG1 for glass, porcelain or stoneware receptacles within a protective fiber drum;

(9) 6PG2 for glass, porcelain, or stoneware receptacles within a protective fiberboard box;

(10) 6PH1 for glass, porcelain or stoneware receptacles within a protective expanded plastic packaging; and

(11) 6PH2 for glass, porcelain, or stoneware receptacles within a protective solid plastic packaging.

(b) Construction requirements for composite packagings with inner receptacles of glass, porcelain, or stoneware are as follows:

(1) Inner receptacles must conform to the following requirements:

(i) Receptacles must be of suitable form (cylindrical or pear-shaped), be made of good quality materials free from any defect that could impair their strength, and be firmly secured in the outer packaging.

(ii) Any part of a closure likely to come into contact with the contents of the receptacle must be resistant to those contents. Closures shall be fitted so as to be leakproof and secured to prevent any loosening during transportation. Vented closures must conform to § 173.24(f) of this subchapter.

(2) Protective packagings must conform to the following requirements:

(i) For receptacles with protective steel drum 6PA1, the drum must comply with § 178.504(b). However, the removable lid required for this type of packaging may be in the form of a cap.

(ii) For receptacles with protective packaging of steel crate or steel box 6PA2, the protective packaging must conform to the following:

(A) § 178.512(b);

(B) In the case of cylindrical receptacles, the protective packaging shall, when upright, rise above the receptacle and its closure; and

(C) If the protective crate surrounds a pear-shaped receptacle and is of matching shape, the protective packaging shall be fitted with a protective cover (cap).

(iii) For receptacles with protective aluminum drum 6PB1, the requirements of § 178.505(b) apply to the protective packaging.

(iv) For receptacles with protective aluminum box or crate 6PB2, the requirements of § 178.512(b) apply to the protective packaging.

(v) For receptacles with protective wooden box 6PC, the requirements of § 178.513(b) apply to the protective packaging.

(vi) For receptacles with protective plywood drum 6PD1, the requirements of § 178.507(b) apply to the protective packaging.

(vii) For receptacles with protective wickerwork hamper 6PD2, the wickerwork hamper shall be properly made with material of good quality. The hamper shall be fitted with a protective cover (cap) so as to prevent damage to the receptacle.

(viii) For receptacles with protective fiber drum 6PG1, the drum must conform to the requirements of § 178.508(b).

(ix) For receptacles with protective fiberboard box 6PG2, the requirements of § 178.516(b) apply to the protective packaging.

(x) For receptacles with protective solid plastic or expanded plastic packaging 6PH1 or 6PH2, the requirements of § 178.517(b) apply to the protective packaging. Solid protective plastic packaging shall be manufactured from highdensity polyethylene or from some other comparable plastic material. The removable lid required for this type of packaging may be a cap.

(3) Quantity limitations are as follows:

(i) Maximum net capacity for packagings for liquids: 60 liters (15.9 gallons).

(ii) Maximum net mass for packagings for solids: 75 kilograms (165.4 pounds).

A new Subpart M would be added to read as follows:

Subpart M—Testing of Non-bulk of Packagings and Packages

§ 178.600 Purpose and scope.

This subpart prescribes certain testing requirements for performance-oriented packagings identified in Subpart L of this part.

§ 178.601 General requirements.

(a) The test procedures prescribed in this subpart are intended to ensure that packages containing hazardous materials can withstand normal conditions of transportation and are considered minimum requirements. Each packaging shall be so manufactured and assembled as to be capable of successfully passing the prescribed tests and of conforming to the requirements of § 173.24 of this subchapter at all times while in transportation.

(b) It is the responsibility of the packaging manufacturer and the shipper, to the extent that assembly functions including final closure are performed by the latter, to assure that each package is capable of passing the prescribed tests.

(c) The packaging manufacturer shall achieve successful test results for each new or different packaging at the start of production of that packaging and at intervals established by the manufacturer of sufficient frequency to ensure that all packagings are capable of passing the prescribed tests. With the exception of the chemical compatability test for plastic receptacles (§ 178.608 of this subchapter) production tests must be conducted at least once in each 12 month period. For the purpose of this subpart, a different packaging is one that differs from a previously produced packaging in structural design, size, material of construction, wall thickness or manner of construction but does not include—

(1) A packaging which differs only in reduced design height (The cross-sectional shape and area must remain the same.);

(2) A packaging which differs only in surface treatment;

(3) A combination packaging which differs only in that the outer packaging has been successfully tested with different inner packagings (A variety of such different inner packagings may be assembled in this outer packaging without further testing); or

(4) A plastic packaging which differs only with regard to additives which conform to § 178.509(b)(3) or § 178.517(b)(4) or (5).

(d) The manufacturer shall conduct the tests prescribed in this subpart using random samples of production packagings, in the numbers specified in the appropriate test section. In addition, the leakproofness test shall be performed on every new packaging by the manufacturer or reconditioned packaging by the shipper or reconditioner, to which it applies.

(e) The Director, OHMT, may approve the selective testing of packagings that differ only in minor respects from a tested type, including packagings containing a lesser number or smaller sizes of inner packagings or with inner packagings of lower net mass; and packings such as drums, bags, and boxes which are produced with small reductions in external dimension.

(f) Notwithstanding the retest intervals specified in paragraph (c) of this section, the Director, OHMT, may at any time require proof, through testing in accordance with this subpart, that packagings meet the requirements of this subpart. As required by the Director, OHMT, the manufacturer shall either—

(1) Conduct performance tests in accordance with this subpart; or

(2) Supply packagings, in quantities sufficient to conduct tests in accordance with this subpart, to the Director, OHMT, or a designated representative.

(g) If an inner treatment or coating of a packaging is required for safety reasons, the manufacturer shall design the packaging so that the treatment or coating retains its protective properties even after withstanding the tests prescribed by this subpart.

(h) The manufacturer shall keep records of test results for at least one year and make them available for inspection by a representative of the Department upon request.

§ 178.602 Preparation of packagings and packages for testing.

(a) Tests shall be carried out on packagings and packages as prepared for transportation, including inner receptacles in the case of combination packagings.

(b) For the drop and stacking test, inner and single-unit receptacles shall be filled to not less than 95 percent of their capacity in the case of solids and not less than 98 percent in the case of liquids. The materials to be transported in the packagings may be replaced by non-hazardous materials, except for chemical compatibility testing or where this would invalidate the results of the tests.

(c) If the materials to be transported are replaced for test purposes by nonhazardous materials, the materials used must be of the same or higher specific gravity as the materials to be carried and their other physical properties (grain, size, viscosity) which might influence the results of the required tests must correspond as closely as possible to those of the hazardous materials to be transported.

(d) Paper or fiberboard packagings shall be conditioned for at least 24 hours in an atmosphere maintained—

(1) At 50 percent ± 2 percent relative humidity, and at a temperature of 23 °C ±2 °C (73 °F±4 °F); or

(2) At 65 percent ±2 percent relative humidity, and at a temperature of 20 °C±2 °C (68 °F±4 °F), or 27 °C±2 °C (80 °F±4 °F); or

(3) For testing at periodic intervals only (i.e., other than initial design qualification testing), at ambient conditions.

(e) Each packaging shall be closed in preparation for testing in the same manner as if prepared for actual shipment. All closures shall be installed using proper techniques and torques.

(f) Bung-type barrels made of natural wood shall be left filled with water for at least 24 hours before the tests.

(g) Except as provided in § 173.24(e)(3)(iii) of this subchapter, plastic receptacles shall be subjected to the chemical compatibility test provided in § 178.608 before undergoing the drop, stacking and, where applicable, internal pressure and leakproofness tests.

§ 178.603 Drop Test

(a) The number of drops required and the packages' orientation are as follows:

Packaging	No. of test samples	Drop orientation
Steel drums, Aluminum drums, Metal drums (other than steel or aluminum), Steel jerricans, Plywood drums, Wooden barrels, Fibre drums, Plastics drums and jerricans, Composite packagings which are in the shape of a drum.	Six (three for each drop).	First drop (using three samples): the package must strike the target diagonally on the chime or, if the packaging has no chime, on a circumferential seam or an edge. Second drop (using the other three samples): the package must strike the target on the weakest part not tested by the first drop, for example a closure or, for some cylindrical drums, the welded longitudinal seam of the drum body.
Boxes of natural wood, Plywood boxes, Reconstituted wood boxes, Fiberboard boxes, Plastic boxes, Steel or aluminum boxes, Composite packagings, which are in the shape of a box.	Five (one for each drop).	First drop: flat on the bottom (using the first sample). Second drop: flat on the top (using the second sample). Third drop: flat on the long side (using the third sample). Fourth drop: flat on the short side (using the fourth sample). Fifth drop: on a corner (using the fifth sample).
Bags—single-ply with a side seam.	Three (three drops per bag).	First drop: flat on a wide face (using all three samples). Second drop: flat on a narrow face (using all three samples). Third drop: on an end of the bag (using all three samples).
Bag—single-ply without a side seam, or multi-ply.	Three (two drops per bag).	First drop: flat on a wide face (using all three samples). Second drop: on an end of the bag (using all three samples).

(b) *Special preparation of test samples for the drop test.* Testing of plastic drums, jerricans, and boxes, composite packagings with inner plastic receptacles, and of combination packagings with inner plastic receptacles, other than expanded plastic boxes and bags, shall be carried out when the temperature of the test sample and its contents has been reduced to −18 °C (0 °F) or lower. Test liquids shall be kept in the liquid state, if necessary, by the addition of anti-freeze.

(c) *Target.* The target must be a rigid, non-resilient, flat and horizontal surface.

(d) *Drop height.* Drop heights, measured as the vertical distance from the target to the lowest point on the package, are determined as follows:

(1) For solids and liquids, if the test is performed with the solid or liquid to be transported or with a non-hazardous material having essentially the same physical characteristic, the drop height is determined according to Packing Group, as follows:

(i) Packing Group I: 1.8 meters (5.91 feet).

(ii) Packing Group II: 1.2 meters (3.94 feet).

(iii) Packing Group III: 0.8 meter (2.62 feet).

(2) For liquids, if the test is performed with water—

(i) Where the materials to be carried have a specific gravity not exceeding 1.2, drop height is determined according to Packing Group, as follows:

(A) Packing Group I: 1.8 meters (5.91 feet).

(B) Packing Group II: 1.2 meters (3.94 feet).

(C) Packing Group III: 0.8 meter (2.62 feet).

(ii) Where the materials to be transported have a specific gravity exceeding 1.2, the drop height shall be calculated on the basis of the specific gravity (SG) of the material to be carried, rounded up to the first decimal, as follows:

(A) Packing Group I: SG X 1.5 meters (4.92 feet).

(B) Packing Group II: SG X 1.0 meter (3.28 feet).

(C) Packing Group III: SG X 0.67 meters (2.25 feet).

(e) *Criteria for passing the test.* A package is considered to successfully pass the drop tests if for each sample tested—

(1) For receptacles containing liquid, each receptacle does not leak when equilibrium has been reached between the internal and external pressures;

(2) For removable head drums for solids, the entire contents are retained by an inner packaging (e.g., a plastic bag) even if the closure on the top head of the drum is no longer sift-proof;

(3) For a bag, neither the outermost ply nor an outer packaging exhibits any damage likely to adversely affect safety during transport;

(4) For a composite or combination packaging, there is no damage to the outer packaging likely to adversely affect safety during transport, and there is no leakage of the filling substance from the inner packaging;

(5) For a drum, jerrican or bag, any discharge from a closure is slight and ceases immediately after impact with no further leakage; and

(6) For packagings for explosives, no rupture of the packaging occurs.

§ 178.604 Leakproofness test.

(a) *General.* The leakproofness test shall be performed with compressed air or other suitable gases on all packagings

intended to contain liquids; however, this test is not required for inner packagings of combination packagings.

(b) *Number of packagings to be tested.* (1) *Production testing.* All packagings subject to the provisions of this section shall be tested and must pass the leakproofness test:

(i) Before they are first used in transportation; and

(ii) Prior to reuse, when authorized for reuse by § 173.28 of this subchapter.

(2) *Design qualification testing.* Three samples of each different packaging shall be tested and must pass the leakproofness test.

(c) *Special preparation.* (1) For design qualification testing, packagings must be tested with closures in place. For production testing, packagings need not have their closures in place.

(2) For testing with closures in place, vented closures shall either be replaced by similar non-vented closures or the vent shall be sealed.

(d) *Test method.* The packaging shall be restrained under water while an internal air pressure is applied; the method of restraint must not affect the results of the test. The test must be conducted for a period of time sufficient to pressurize the interior of the packaging to the specified air pressure. and to determine if there is leakage of air from the packaging. Other methods, at least equally effective, may be used, if approved by the Director, OHMT.

(e) *Pressure applied.* An internal air pressure (gauge) must be applied to the packaging as indicated for the following packing groups:

(1) Packing Group I: Not less than 30 kilopascals (4.4 psi).

(2) Packing Group II: Not less than 20 kilopascals (2.9 psi).

(3) Packing Group III: Not less than 20 kilopascals (2.9 psi).

(f) *Criteria for passing the test.* A packaging passes the test if there is no leakage of air from the packaging.

§ 178.605 Hydrostatic pressure test.

(a) *Packagings to be tested.* The hydrostatic pressure test shall be performed on samples of all metal, plastic, and composite packagings intended to contain liquids. This test is also required for inner packagings of combination packagings intended for transportation by aircraft.

(b) Number of test samples. Three test samples are required for each different packaging.

(c) Special preparation of receptacles for testings. Vented closures shall either be replaced by similar non-vented closures or the vent shall be sealed.

(d) Test method and pressure to be applied. Metal packagings and composite packagings other than plastic (e.g., glass, porcelain or stoneware), including their closures, shall be subjected to the test pressure for 5 minutes. Plastic packagings and composite packagings (plastic material), including their closures, shall be subjected to the test pressure for 30 minutes. This pressure is the one to be marked as required in § 178.503(a)(5). The receptacles shall be supported in a manner that does not invalidate the test. The test pressure shall be applied continuously and evenly and it shall be kept constant throughout the test period. The hydraulic pressure (gauge) applied, taken at the top of the receptacle, and determined by any one of the following methods shall be:

(1) Not less than the total gauge pressure measured in the packaging (i.e., the vapor pressure of the filling material and the partial pressure of the air or other inert gas minus 100 kilopascals (14.5 psi) at 55 °C (131 °F) and multiplied by a safety factor of 1.5. This total gauge pressure shall be determined on the basis of a maximum degree of filling in accordance with § 173.24a(b)(3) of this subchapter and a filling temperature of 15 °C (59 °F);

(2) Not less than 1.75 times the vapor pressure at 50 °C (122 °F) of the material to be transported minus 100 kilopascals (14.5 psi) but with a minimum test pressure of 100 kilopascals (14.5 psi); or

(3) Not less than 1.5 times the vapor pressure at 55 °C (131 °F) of the material to be transported minus 100 kilopascals (14.5 psi), but with a minimum test pressure of 100 kilopascals (14.5 psi).

Packagings intended to contain hazardous materials of Packing Group I shall be tested to a minimum test pressure of 250 kilopascals (36.3 psi).

(e) *Pressure test requirements for air transport.* Additional pressure test requirements for air transport, contained in § 173.27(c) of this subchapter, may exceed the pressure test required by paragraph (d) of this section.

(f) *Criteria for passing the test.* A package passes the hydrostatic test if, for each test sample, there is no leakage of liquid from the package.

§ 178.606 Stacking test.

(a) *General.* All packages other than bags shall be subjected to a stacking test.

(b) *Number of test samples.* Three test samples are required for each different packaging.

(c) *Test method.* The test sample shall be subjected to a force applied to the top surface of the test sample equivalent to the total weight of identical packages which might be stacked on it during transport. The minimum height of the stack, including the test sample, must be 3.0 meters (9.84 ft.). The duration of the test must be 24 hours, except that plastic drums, jerricans, and composite packaging 6HH, intended for liquids, shall be subjected to the stacking test for a period of 28 days at a temperature of not less than 40 °C (104 °F). Alternative test methods which yield equivalent results may be used if approved by the Director, OHMT.

(d) *Criteria for passing the test.* No test sample may leak. In composite packagings or combination packagings, there must be no leakage of the filling substance from the inner receptacle, or inner packaging. No test sample may show any deterioration which could adversely affect transport safety or any distortion likely to reduce its strength or cause instability in stacks of packages. Stacking stability is considered sufficient when, after the stacking test, and, in the case of plastic receptacles after cooling to ambient temperature, two receptacles of the same type filled with water placed on each test sample maintain their positions for one hour.

§ 178.607 Cooperage test for bung-type wooden barrels.

(a) *Number of samples.* One barrel is required for each different packaging.

(b) *Method of testing.* Remove all hoops above the bilge of an empty barrel at least two days old.

(c) *Criteria for passing the test.* A packaging passes the cooperage test only if the diameter of the cross-section of the upper part of the barrel does not increase by more than 10 percent.

§ 178.608 Chemical compatibility test for plastic receptacles.

(a) This chemical compatibility test must be performed on samples of all packagings where plastic comes in contact with liquid hazardous material.

(b) Three test samples of each different packaging must withstand without failure the procedure specified in Appendix B of Part 173, entitled "Procedure for Testing Chemical Compatibility and Rate of Permeation in Polyethylene Packagings and Receptacles".

(c) In addition to the test requirement of this section, plastic packagings and receptacles must conform to the compatibility requirements of § 173.24(e) of this subchapter.

PART 179—SPECIFICATIONS FOR TANK CARS

The authority citation for Part 179 would continue to read as follows:

Authority: 49 U.S.C. 1803, 1804, 1805, 1806, 1808; 49 CFR Part 1, unless otherwise noted.

Section 179.14 would be revised to read as follows:

§ 179.14 Coupler vertical restraint system.

(a) *Performance standard.* Each tank car shall be equipped with couplers capable of sustaining, without disengagement or material failure, vertical loads of at least 200,000 pounds (90,718.5 kg) applied in upward and downward directions in combination with buff loads of 2,000 pounds (907.2 kg), when coupled to cars equipped with couplers that do have this vertical restraint capability, and cars equipped with couplers, that do not have this vertical restraint capability.

(b) *Test verification and approval.* Except as provided in paragraph (d) of this section, compliance with the requirements of paragraph (a) of this section shall be achieved by verification testing of the coupler vertical restraint system in accordance with paragraph (c) of this section, and approval of the Federal Railroad Administrator.

(c) *Coupler vertical restraint tests.* A coupler vertical restraint system shall be tested under the following conditions:

(1) The test coupler shall be tested with a mating coupler (or simulated coupler) having only frictional vertical force resistance at the mating interface; or a mating coupler (or simulated coupler) having the capabilities described in paragraph (a) of this section.

(2) The testing apparatus shall simulate the vertical coupler performance at the mating interface and may not interfere with coupler failure or otherwise inhibit failure due to force applications and reactions.

(3) The test shall be conducted as follows:

(i) A minimum of 200,000 pounds (90,718.5 kg) vertical downward load shall be applied continuously for at least five minutes to the test coupler head simultaneously with the application of a nominal 2,000-pound (907.2 kg) buff load;

(ii) The procedures prescribed in paragraph (c)(3)(i) of this section shall be repeated with a minimum vertical upward load of 200,000 pounds (90,718.5 kg); and

(iii) A minimum of three consecutive successful tests shall be performed for each load combination prescribed in paragraphs (c)(3) (i) and (ii) of this section. A test is successful when a vertical disengagement or material failure does not occur during any of the prescribed load combinations.

(d) *Listing of approved couplers.* The following classes of couplers have been approved by the Federal Railroad Administrator and need not be verified by the testing requirements of paragraph (c) of this section:

(1) E top bottom shelf couplers designated by the Association of American Railroads' Catalog Nos. SE60CHT, SE60CHTE, SE67BHT, SE67BHTE, SE68BHT or SE68BHTE; and

(2) F top shelf couplers designated by the Association of American Railroads' Catalog Nos. SF70CHT, SF70CHTE, SF73AHT, SF73AHTE, SF79CHT or SF79CHTE.

§ 179.101-1 [Amended]

In § 179.101-1, the table of individual specification requirements would be revised as follows:

a. The column for DOT Specification 112A400 F is removed.

b. The "Insulation" requirement entry for 112A200W, 112A340W, 112A400W, 112A500W, 114A340W, and 114A400W is changed from "[4] None" to "[4, 13]Optional".

c. Footnote 13 is added to read: "[13] Tank cars equipped with insulation per § 179.100-18 of this subchapter may be stenciled "EQUIPPED WITH INSULATION PER 49 CFR 179.100-18".

d. The DOT specification entry "112A400W[12]" is revised to read "112A400W[11, 12]".

§ 179.102 [Removed and reserved].

Section 179.102 would be removed and reserved.

The title to § 179.105 would be revised to read as follows:

§ 179.105 Special requirements for Specification 105S, 105J, 111J, 112S, 112J, 112T, 114S, 114J and 114T tank cars.

* * * * *

Section 179.105-1 would be revised to read as follows:

§ 179.105-1 General.

(a) In addition to the requirements of this section, each Specification 105S, 105J, 111J, 111J, 112S, 112J, 112T, 114S, 114J and 114T tank car must meet the applicable requirements of § 179.100, 179.101, 179.103, and 179.104.

(b) Notwithstanding the provisions of §§ 179.3, 179.4 and 179.6, AAR approval is not required for changes in or additions to tank cars necessary to comply with this section.

(c) Each Specification 105S, 105J, 111J, 112S, 112J, 112T, 114S, 114J, and 114T tank car shall be equipped with a tank head puncture resistance system that meets the requirements of § 179.105-5.

(d) Each Specification 105J, 111J, 112J, 112T, 114J, and 114T tank car shall be equipped with:

(1) A thermal protection system that meets the requirements of § 179.105-4: and

(2) A safety valve that meets the requirements of § 179.105-7.

§§ 179.105-2 and 179.105-3 [Removed and reserved]

Section 179.105-2 and 179.105-3 would be removed and reserved.

§ 179.105-4 [Amended]

In paragraph (a) of § 179.105-4, the phrase "Each specification 112T, 112J, 114T, and 114J tank car" would be changed to read "Each Specification 105J, 111J, 112J, 112T, 114J, and 114T tank car".

§ 179.105-6 [Removed and reserved]

Section 179.105-6, would be removed and reserved.

§ 179.107-7 [Amended]

In paragraph (a) of § 179.105-7, the phrase "each 112 and 114 tank car" would be changed to read "each Specification 105J, 111J, 112J, 112T, 114J, and 114T tank car".

In § 179.105-8, paragraphs (d) and (e) would be added to read as follows:

§ 179.105-8 Stenciling.

* * * * *

(d) Each Specification 105 tank car that is equipped as prescribed in § 179.105-1(c) shall be stenciled with the letter "S" substituted for the letter "A" in the specification marking.

(e) Each Specification 105 tank car that is equipped as prescribed in § 179.105-1(d) shall be stenciled with the letter "J" substituted for the letter "A" in the specification marking.

§ 179.106 [Removed and reserved]

Section 179.106 would be removed and reserved.

§ 179.201-1 [Amended]

In § 179.201-1, the column heading "111A100W4" would be revised to read "111A100W4[3]" and a footnote 3 would be added to the footnotes of the Table to read: "[3] Tank cars equipped with insulation per § 179.100-18 of this subchapter may be stenciled "EQUIPPED WITH INSULATION PER 49 CFR 179.100-18".

§ 179.202 [Removed and reserved]

Section 179.202 would be removed and reserved.

§ 179.203 [Amended]

In § 179.203, paragraphs (c) and (d) would be removed in § 179.203-1 and

paragraph (a)(1) would be removed from § 179.203–2.

§ 179.302 [Removed and reserved]

Section 179.302 would be removed and reserved.

Issued in Washington, DC on April 1, 1987 under authority delegated in 49 CFR Part 106, Appendix A.

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[FR Doc. 87–7653 Filed 4–30–87; 9:46 am]

BILLING CODE 4910–60–M